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MODERN MANAGEMENT

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MARCH 1950

Where Do We Begin?

OURS is a troubled world. There can be no doubt about that. Everywhere we turn there are problems which seem almost impossible to surmount. Troubled relations in the home, in business, in government and internationally create a general feeling of insecurity. Such a feeling is not conducive to progress, and itself accentuates the uncertainty which exists today.

I know that all is not well with the world today. And yet to me the situation is far from hopeless. On the contrary it offers the kind of challenge to the American people to which they have always responded. The greatest progress of this Nation has been made during periods of insecurity. When the American people get their back to the wall they really begin to fight. And they have always found a way to win even when the odds were terrifically against them. Today we face just such a crisis. We have our backs to the wall. The greatest danger lies in the fact that we might fail to recognize this crisis for what it is and not begin our fight soon enough.

Where do we begin? We begin wherever we are, in whatever walk of life. Our first great task is to develop understanding and unity in all our institutions throughout the Nation. We must learn to talk together about our problems, our hopes, our aims, our ideals.

When we come to grips with a problem that involves others we must start with a desire to see it settled on the basis of "What is right" *not* "Who is right." One of my good friends who is Vice-President of Industrial Relations for his company writes on the blackboard before each bargaining meeting with his union, "Let's have more light and less heat in our discussion." This has equal application regardless of the parties and problems involved. If an adequate solution is to be reached, it requires objectivity and careful analysis, not subjectivity and snap judgment.

The first step is to be in the right frame of mind. This means a willingness to give more than we expect to receive. It means entering a discussion with the belief that if the other fellow knows for what he may count on us, he will live up to what we expect from him. It means entering negotiations of whatever sort expecting the best, not the worst from others. It means having faith in people and in the principles for which we stand.

The development of the right frame of mind must be preceded by a critical analysis of our objectives. We must know what they are, that they are worthwhile and that each specific objective is necessary to attainment of the end result which we seek. We must believe in them implicitly, or they are not worth fighting for.

When we have properly conditioned ourselves, we have made a long stride toward the development of the kind of relationship with others which will permit and facilitate the attainment of our objectives.

One of the finest examples of this kind of cooperative approach to a problem may be found in the Society's Student Chapters located all over the country. There has long been a certain amount of rivalry between Industrial Engineering Schools and Schools of Business Administration, yet in many Universities the Schools of Industrial Engineering and Commerce or Business Administration are cooperating in sponsoring a Student Chapter. As one Dean of Engineering expressed it to me recently . . .

> "Our task is to train the youth who come to us in the best way we know, in order that they may be able to make the greatest possible contribution to the businesses with which they become associated, to the field of Management generally and to the Society, and of course benefit accordingly. If we are to accomplish this we must develop a close relationship between Industrial Engineering and Business Administration students. We cannot afford at the university level to have any lines or barriers develop between two groups of tomorrow's managers. We must develop and promote increased unity. This is our job as we see it."

The President of the Student Chapter in that school told me how carefully the members of that Chapter were selected. He, an Engineer, said,

> "We consider it a privilege to be a part of SAM. Engineers and Business Administration students alike are admitted if we feel that they are really and sincerely interested in the objectives of our group. We feel that we are gaining a great deal through sharing ideas with the Business Administration students. There is not a member of our Chapter that will not be a better management man because of his participation in our Society."

We as members of SAM owe our thanks to all of the faculty leaders in Business Administration and in Industrial Engineering who share the idea of the Dean quoted here.

One cannot help but take great hope from these and other expressions. Six thousand students (all student members) believe in SAM and in the future of America. And we believe in them.

Our Society is in a particularly fortunate position. No vested interests—only a desire to advance the science of Management in all its functions and at all responsible levels—wherever Management is practiced. Our Chapters bring together people from all functions, all levels, all types of business and industry, education and government and here we learn to think together — to discuss mutual problems and objectives. Here we learn to share ideas, to work together for mutual self help and service to others. As we in the Management profession learn to live closely together, to work together and with others in peace and harmony, this will be reflected in the other institutions of our land, and in turn internationally. Let's show the way. *This* is where we begin.

DILLARD E. BIRD

Volume XV Number 3

March 1950

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ROBERT B. ROSS

Consulting Editors
ORDWAY TEAD DON F. COPELL

Advanced Management

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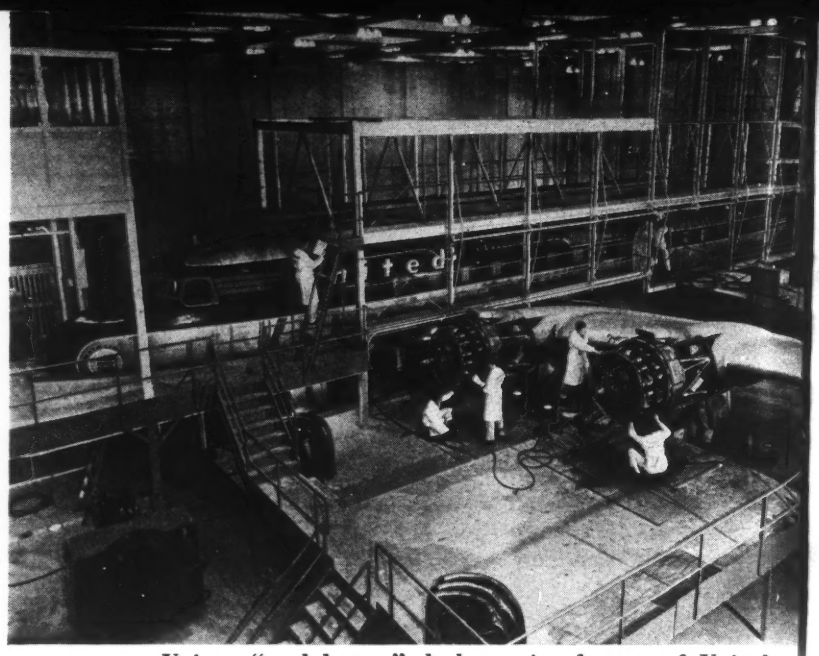
Maintenance Management

A Case from Transportation

By G. E. KECK

Superintendent, Work Analysis Div., United Air Lines

Complexity of equipment multiplied by varying schedules and rising costs created a major maintenance probem. The solution demonstrates principles that apply to many less involved situations which have been regarded as "possible to control."



Unique "push-button" dock—major feature of United Air Lines' San Francisco maintenance base. Electrically operated catwalks slash hours from time formerly necessary for overhaul work.

LINE and overhaul maintenance for the United Air Lines fleet cost more than fourteen million dollars in 1948, or 17% of the total company operating cost. Maintenance is the largest single item of operating cost.

Our fleet of airplanes includes 4 Boeing 377's, 39 DC-6's, 29 DC-4's and 69 DC-3's. Within the near future, 3 additional Boeing 377's and 5 DC-6's will be added, giving us a total fleet of 149 planes at that time. In 1949 this fleet flew approximately 1,353,046,000 revenue passenger miles.

United Air Lines operates a coast to coast, Pacific coast and California-Hawaii system of 10,700 route miles providing service to 80 cities.

In order to clarify later references, definition of the terms "overhaul" and "line maintenance" is necessary. Overhaul is accomplished only at the San Francisco Maintenance Base whenever the flying time of an airplane reaches approximately 1000 hours, and includes the removal and replacement of engines and other components. Line Maintenance is accomplished at any of several stations at intervals of about 50 flying hours and comprises inspection and testing of various items in accordance with a prescribed check list to insure serviceability of the airplane.

TREND OF MAINTENANCE COSTS

Beginning in 1946, maintenance costs, in conjunction with almost all other costs, started moving upward at a rapid rate. However, the rise in maintenance costs was particularly pronounced since the introduction of two new types of four engine airplanes (DC-4 and DC-6) with their attendant training and mechanical problems accentuated the effects of the inflationary spiral of labor, material and service prices. As a result of these factors, maintenance costs by 1948 had increased 60% over 1946. (See Exhibit #1.)

Contrary to the practice of raising prices in many industries during this period of inflation, the price of air transportation could not be advanced at will, since any change in tariff must have the approval of the Civil Aeronautics Board as being in the public interest. Consequently, losses continued to increase rapidly. The only solution to the problem lay in cost reductions, and maintenance appeared to offer the most fertile field.

APPROACH TO COST REDUCTION

Cost reduction as an end in itself has no value in the maintenance field of the air transport industry. Economy through revised procedures or equipment changes can be realized only when an affirmative answer can be given to the question: "Will the change maintain, or improve, all elements of safety?" The importance of the safety factor requires that the most careful evaluation be given to any changes involving airplane flight.

In early 1946 intensive search was undertaken to find constructive means for cost reduction in the maintenance field. Some of the possibilities for economy that offered promise for exploration were as follows:

1. Consolidation of the two separate overhaul centers at San Francisco and Cheyenne into a single, modern base.
2. Leveling of the workload content of the 1000 hour overhauls through an improved production control method.
3. Leveling of the erratic month to month flow of overhauls into the Base in order to provide a more constant year 'round workload.
4. Elimination of overhaul functions being done more as a matter of custom than necessity.
5. Concentration of line maintenance checks between overhauls at fewer locations on the system in order to eliminate some of the idle time of maintenance crews retained for routine work.
6. Lessening the frequency of line maintenance checks through realignment of functions, and equalizing the work content of the checks to the maximum extent possible.

Before any of these ideas could be placed into effect, a great deal of research and study was required of many separate groups within the company. The results of these investigations indicated that a great deal could be accomplished.

CONSOLIDATION OF OVERHAUL BASES

Careful evaluation of overhaul facilities and organization at San Francisco and Cheyenne revealed considerable duplication of personnel and facilities. Since rapid growth of the business and the introduction of newer and more complex flight equipment had made obsolete much of the old plant, a decision was reached to build a single, modern base for overhaul of all types of aircraft at San Francisco.

Built at a cost of approximately $5,000,000, this new base went into full operation in 1948. We believe it is the finest plant of its kind in the world.

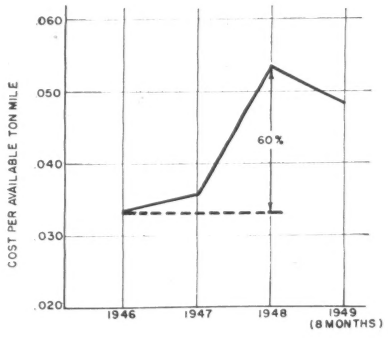
Initial evaluation of the economy to be realized from the construction of this facility indicated a potential annual savings of $600,000 in payroll costs. Operation for the first eight months of 1949 compared with the similar period of 1948 indicated an actual cost reduction of 11%, with a payroll reduction of 281 people, representing a direct savings of $862,000 per year as compared with the $600,000 expected. This economy was realized in spite of a 15% increase in the amount of work produced by the Base during this period.

There still remained the troublesome factor of extreme variations in the workload per airplane under the existing "major" overhaul plan. This plan required the removal of components on various elapsed time bases of 1000, 2000, 3000 hours, etc., with a so-called "major" service every 8000 hours, requiring the performance of additional large jobs, such as replacement of wings.

EXHIBIT NO. 1

LINE AND OVERHAUL MAINTENANCE COSTS

PER AVAILABLE TON MILE



The net result was a difference of as much as 400% in the work content of an 8000 hour overhaul as compared with a 1000 or 5000 hour overhaul. (See Exhibit #2.) Such a situation precluded the possibility of manning on an economical basis, since it was necessary to have sufficient personnel to handle the maximum workload even though the incidence of such a load occurred only at intervals.

To allow for a more uniform workload at each overhaul, and to provide a means of predicting this load, a "progressive" overhaul plan was adopted. Under this method, the overhaul of major components was leveled out over a series of 24 engine overhauls, which allows maximum utilization from "odd run" components. For example, under the old major overhaul plan a 3000 hour unit had to be removed at the 8000 hour or major overhaul time, resulting in a 1000 hour loss of time. Under the "progressive" plan, the unit would not be removed until the 9000 hour overhaul, with no loss of useful life.

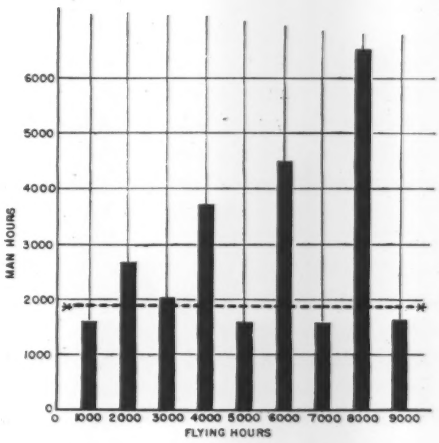
As a result of this change, there is less than 100 manhours variance in the planned workload for any of the overhaul times (i.e. — 1000, 2000, 3000 hours). (Refer to broken line on Exhibit #2.) This allows for better planning of manpower requirements, better determination of "out of service" time and minimizing of spare parts requirements.

After adoption of the "progressive" overhaul system there still remained the problem of obtaining maximum utilization of employee skills and time during the period an airplane was in the dock. This was accomplished through the use of a production control system called the "Sched-U-Graph." Prior to the arrival of a plane at the Base for overhaul, shop planners pre-load the Sched-U-Graph board for the period of five days in which the plane is to be in the dock. The left margin contains the names of the dock crew members in a vertical line. Opposite each crew member's name are inserted in visible pockets the job cards of work to be done, with each card bearing a colored band plotted on an elapsed time scale for the required job time. The job cards are inserted in accordance with an elapsed time scale shown at the top of the Sched-U-Graph.

EXHIBIT NO. 2

COMPARISON OF OVERHAUL WORK CONTENT

UNDER THE "MAJOR" OVERHAUL SYSTEM



* WORK LOAD CONTENT OF OVERHAULS UNDER THE PROGRESSIVE OVERHAUL PLAN

By this means the planned and open time for each worker become immediately apparent.

Benefits derived from the use of the Sched-U-Graph include:

1. Maximum use of employees' time and skills.
2. Visible means for the dock foreman to determine whether the overhaul is behind, ahead of or on time.
3. Maximum use of "free" time for performing necessary or desirable project work without disruption of the overall schedule for release of the plane to service.
4. A check of planned versus actual time for each job, since each worker must clock in and out on every job.
5. Elimination of work area congestion by visibly indicating the amount of work being done in any area at one time.

TIME STUDY YARDSTICK FOR PERFORMANCE AND BUDGETS

Job times for line maintenance work as well as all other station and field office functions have been established by means of timestudy, using the principles of the Standard Hour plan. In the case of overhaul operations at the Maintenance Base, the job times now in use were derived from a combination of experience, supervisor and production engineer estimates. These job times are presently being replaced by standard

values developed through time and motion study.

Standards are used not only as an "after the fact" measure of performance, but also as a budgeting medium through application to forecast schedules and payloads. This latter use has been particularly helpful, since seasonal variations in traffic create severe manpower planning problems.

LEVELING THE FLOW INTO OVERHAUL

After all of the foregoing improvements in the overhaul procedure had been effected, it was still true that much manpower loss was incurred due to the variation in the number of overhauls to be accomplished from month to month.

An analysis was made and a control plan was developed to equalize the Base workload throughout the year, thereby reducing the fluctuation of labor costs and spare parts inventories. The plan, instituted early in 1949, is based on:

1. Making a long range projection of Maintenance Base workload.
2. Developing a pattern of plane utilization to make the projection good.
3. Controlling the daily plane utilization according to the pattern.

This plan uses the principle of the mean fleet TSO (time since overhaul) as a controlling factor.

REDUCING WORK CONTENT OF OVERHAULS

There was reason to believe that certain work done at overhaul time was carried on more as a matter of custom than necessity. As a result, Operations assigned three engineers to the task of carefully analyzing every function performed at overhaul time with a view to the elimination of those items which experience, as proved by records of long standing, showed to be unnecessary. In the first thirty days' analysis, a number of inspection items were found to be no longer necessary due to engineering improvements in design or materials. These items were eliminated, resulting in a tangible savings of $60,000 per year. This work is still in progress.

CONSOLIDATING LINE MAINTENANCE CENTERS

Prior to 1949 the periodic line maintenance checks were accomplished at six inspection points; namely, at New York, Newark, Chicago, San Francisco, Seattle and Los Angeles. These checks involve inspection of the mechanical functioning and structural condition of the airplane, and are made at 50 hour intervals.

In analyzing the resultant direct labor costs under this situation it became evident that labor costs per available ton mile had risen rapidly since 1946.

Further analysis of the day to day workload pattern at the maintenance points revealed that the major reason for this high labor cost was the low utilization of available manpower.

As a result of this analysis it was determined that substantial economies could be achieved through a reduction in the number of locations at which scheduled inspections were performed. Basically, it was anticipated that savings would result through this centralization for the following reasons:

1. Performance of maintenance checks at fewer points would provide a volume of work at each point sufficient to utilize semi-production methods. This would result in a substantial reduction in direct labor costs with additional savings resulting from a concentration of aircraft parts, facilities, and equipment.

2. Centralization of maintenance would permit the standardization of methods, greater specialization of work and better supervision and inspection, all of which tend to improve work quality as well as to effect economy.

3. The use of production methods in maintenance would reduce the ground time per check and thereby aid in increasing the utilization of aircraft for revenue purposes.

4. With maintenance more centralized, a lesser investment in facilities would be possible. Some return has already been realized at the new Seattle-Tacoma terminal, where a much less costly hangar was built than would have been the case if check work had been continued there.

Prior to final decision on centralization of line maintenance at fewer locations, one important factor remained to be proved. This involved the question of aircraft routing; that is, whether aircraft could be routed into only two or three maintenance points without lowering the utilization of aircraft hours for revenue purposes. To answer this question a comprehensive study was made of existing scheduling and routing methods, in addition to an exhaustive five month analysis of the actual day to day pattern of aircraft movement, time for routine inspection, time for unpredictable repairs, and frequency of unpredictable repairs by location.

This study brought out the following facts:

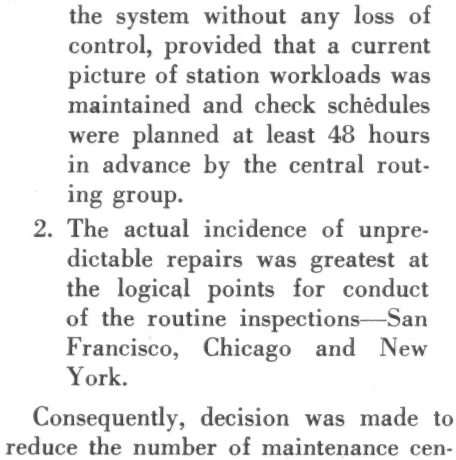
1. That routine inspections could be confined to three locations on the system without any loss of control, provided that a current picture of station workloads was maintained and check schedules were planned at least 48 hours in advance by the central routing group.
2. The actual incidence of unpredictable repairs was greatest at the logical points for conduct of the routine inspections—San Francisco, Chicago and New York.

Consequently, decision was made to reduce the number of maintenance centers from six to three. (See Exhibit #3.) Action on the plan was initiated in March, 1949, and the reduction of centers to three locations accomplished by

EXHIBIT NO 3

LINE MAINTENANCE CENTERS

BEFORE AND AFTER CONSOLIDATION



June. The benefits derived from this move have completely justified the decision, as will be shown subsequently.

FREQUENCY AND CONTENT OF MAINTENANCE CHECKS

In accordance with Civil Aeronautics Board regulations, inspections must be made at specified intervals between overhauls. These inspections are called maintenance checks and are classified as #1, #2 and #3. The checks are of increasing scope, in accordance with the numerical designation; i.e., a #2 check is more extensive than a #1 check, etc. It was reasoned that a cost reduction could be achieved if the time interval between these checks could be extended. Therefore, an analysis of operating experience was conducted simultaneously with the study concerning consolidation of line maintenance centers. This analysis proved that, with adjustments in the scope of the #1 and #2 checks, an extension of time was wholly justified, and request was made to the CAB for approval. Approval was granted which allowed for a #1 check at 65 hours, a #2 check at 115 hours and a #3 check at 300 hours. For practical maintenance scheduling, a time interval of 50 hours was adopted, which compared with the former interval of 35 hours.

The net result of the time extension was to reduce the maintenance check labor hours per flying hour from 4.19 to 3.51, a reduction of 16%. In addition, the lower frequency reduced the time that an airplane was out of schedule for maintenance from 23% to 18%, thereby increasing the time available for flying purposes.

After effecting a consolidation of maintenance centers and a decrease in the frequency of checks, it was obvious that it was highly desirable to find a means for leveling the day to day workload at the line maintenance centers. This was true since the type of check to be performed, i.e., — #1, #2, or #3, could not be controlled on a day to day basis, and with an average difference of 130% between manhours required for a #1 and #2 check and 70% between a #2 and #3 check, it was possible to have a sizable variation in the daily workload at the maintenance stations when bunches of #1, #2, or #3 checks occurred in any one day.

To correct this situation, our Engineering Department has started work to redistribute some of the prescribed check items in order to level off these variations. Although consideration has been given to equalizing the #2 and #3 checks, it now appears that leveling the #1 and #2 checks presents the best solution, since it would provide the largest number of uniformly sized work units, the #1 and #2 checks occurring five times for each #3 check, since the sequence of checks for every 300 flying hours is in the order #1, #2, #1, #2, #1, #3. Work along these lines is continuing.

ECONOMIC SUMMARY AND CONCLUSION

The foregoing has touched on the more significant work that has been going on in United Air Lines in connection with organization for maintenance cost reduction and quality improvement. While any dollar evaluation of the economic benefits derived from a program of this nature is always difficult to assess due to the many influences constantly at work in a dynamic industry, the following presents a conservative picture of the economies realized to date on an annual basis:

Consolidation of overhaul work content, leveling of the month to month rate of overhaul and elimination of unnecessary functions	$922,000
Concentration of line maintenance checks at fewer locations, decreasing check frequency and equalizing work content of the various checks.	345,000
Total annual savings	$1,267,000

This economy is a reflection of results from a progressive, positive definition of objectives by management, and cooperative, sincere effort to realize the objectives on the part of the various planning and operating departments of the company.

Productivity per maintenance employee actually has increased at a faster rate than indicated by the above measurement of economies in terms of dollars, since hourly wages have continued to advance in the past year.

Of special importance is the fact that the tangible cost reductions have been accompanied by real improvement in the more intangible factors of quality, dependability and safety of service rendered to the traveling public. As an example, 97½ per cent of all scheduled flights were operated in 1949. Of these, approximately 96 per cent departed "on time" or within 15 minutes of schedule, and 73 per cent arrived at final destination within the same time limits. As compared with 1948, this performance showed improvements of one per cent in flights operated, three per cent in "on time" departures and 24 per cent in "on time" arrivals. Our increase in traffic in the face of a decline in the overall transportation market during the past year gives further evidence of this improvement.

Future growth of the air transport industry together with the introduction of new equipment will add to the many problems always present in the maintenance field. However, we believe that application of the principles followed to date will aid in their solution and continue the advancement of the greatest system of transportation the world has yet known.

MATURITY is a quality of personality that is made up of a number of elements. It is stick-to-itiveness, the ability to stick to a job, to work on it, and to struggle through until it is finished, or until one has given all one has in the endeavor. It is the quality or capacity of giving more than is asked or required in a given situation. It is this characteristic that enables others to count on one; thus it is reliability.

Persistence is an aspect of maturity; persistence to carry out a goal in the face of difficulties; endurance of difficulties, unpleasantness, discomfort, frustration, hardship. The ability to size things up, make one's own decisions, is a characteristic of maturity. This implies a considerable amount of independence. A mature person is not dependent unless ill. Maturity includes determination, a will to achieve and succeed, a will to life.

(*From* Psychiatry in Modern Warfare, *by Edward A. Strecker and Kenneth Appel; copyright* 1945 *by The Macmillan Company and quoted by permission of the publishers.*)

Which Method Is Best?

Part I

By GERALD NADLER, Ph.D.
Asst. Prof. of Industrial Engineering
Washington University, St. Louis, Mo.

Energy expenditure is related to motion study in a pioneer experiment. Possibilities are opened for a "biomechanical" approach to time study.

MOTION study has only recently been formulated as a method for finding better ways of performing jobs. Motion study consists of a number of procedures for analyzing methods of doing work. By breaking a job into known classifications of activity, principles can be applied to the classifications in an attempt to eliminate those portions of the job that are wasteful or ineffective. These principles form the basis of motion study for they aid in finding better procedures in terms of reduced time per unit of work and supposedly reduced physiological expenditure per unit of work.

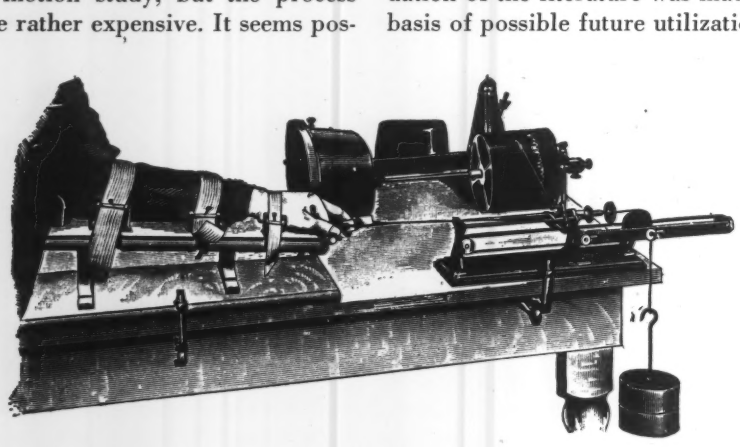
The basis for many of the principles seems to be physiological in nature in that they purport to make a task easier or have a worker expend less energy. There is but little physiological proof for some of these principles, yet they are used on the assumption that the energy expenditure will be decreased. Since a reduction in the physiological expenditure per unit of work by the worker usually results in a reduction of the monetary expenditure per unit of work on the part of the company, it behooves motion study to find the most economical way, physiologically speaking, of performing a job.

There are ways of determining the energy expenditure of a job, or of different ways of performing the same job, but these methods require that the job be in existence before the energy expenditure can be measured. Such procedures for determining the best physiological way of doing a job would also substantiate and/or revise some principles of motion study, but the process would be rather expensive. It seems possible that some physiological information could be integrated with mechanics, to form the subject matter of biomechanics, so that the optimum method of performing a task could be accurately determined before the job began. Since many methods for performing a job can be suggested by present techniques, the problem of this study was to find an *a priori* procedure for the biomechanical determination of the optimum motion pattern for a given task.

LITERATURE REVIEW

In attempting to find physiological information that could be used for the problem of this work, a subjective evaluation of the literature was made on the basis of possible future utilization to the problem of this research. It was found that the available literature, on the basis of the subjective elimination process, could be divided into two classifications, general and specific. General literature reports basic type research which can not be put to any definite use, and specific literature reports research which does have some limited application possibilities.

The general literature covers such information as the tensile strength, Young's modulus of elasticity and the breaking stress of muscles, tendons, bones and nerves, as well as laws of contraction, in relation to muscles, which come from the laws of elasticity of mechanics. These laws are applied to static muscular activity and energy expenditure is given for the entire body. Equations are derived showing the components of total energy expenditure, but these relationships merely state existing conditions with no attempt made to use the formulae for computational purposes. Other general literature reports work done with individual muscles and muscle fibers. The specific literature deals mainly with determination of the energy expenditure of a given task as determined by some form of respiration



The Ergograph—one method of measuring energy expenditures mentioned in general literature.
(As shown in "The Handbook of Advanced Time-Motion Study," by L. A. Sylvester, pub. by Funk & Wagnalls Co.)

Part 1—Adapted from Nadler, G., "A Priori Procedure for Biomechanical Determination of Optimum Motion Pattern", Ph.D Thesis, Purdue University.

apparatus. Special tasks, such as weight lifting, walking on a treadmill, bicycle riding, etc., are described.

Another approach (W. O. Fenn, in a series of articles in the *American Journal of Physiology,* 1930.) to determining the energy expenditure for a specific task used motion pictures. Working on the theory that the kinetic energy of a body member represents energy expended by the member to attain the kinetic energy, the energy expenditure of a runner was determined. By projecting, frame by frame, motion pictures of a runner on a piece of paper, the location of each body member was accurately marked for regular intervals of time. The kinetic energy of each body member was calculated for each interval of time.

Fenn called the total of the *increases* in kinetic energy equal to the energy expended by the body in reaching the various heights of kinetic energy. Fenn's approach to the determination of the energy expenditure of a subject performing a task appeared to offer the best physiological approach to the problem as stated. Using the kinetic energy basis of determining energy expenditure, a mathematical and geometrical approach for the elimination of motion pictures, mechanics and other physiological data, an *a priori* procedure for finding the optimum motion pattern for a given task was determined.

EXPERIMENTAL PROCEDURE

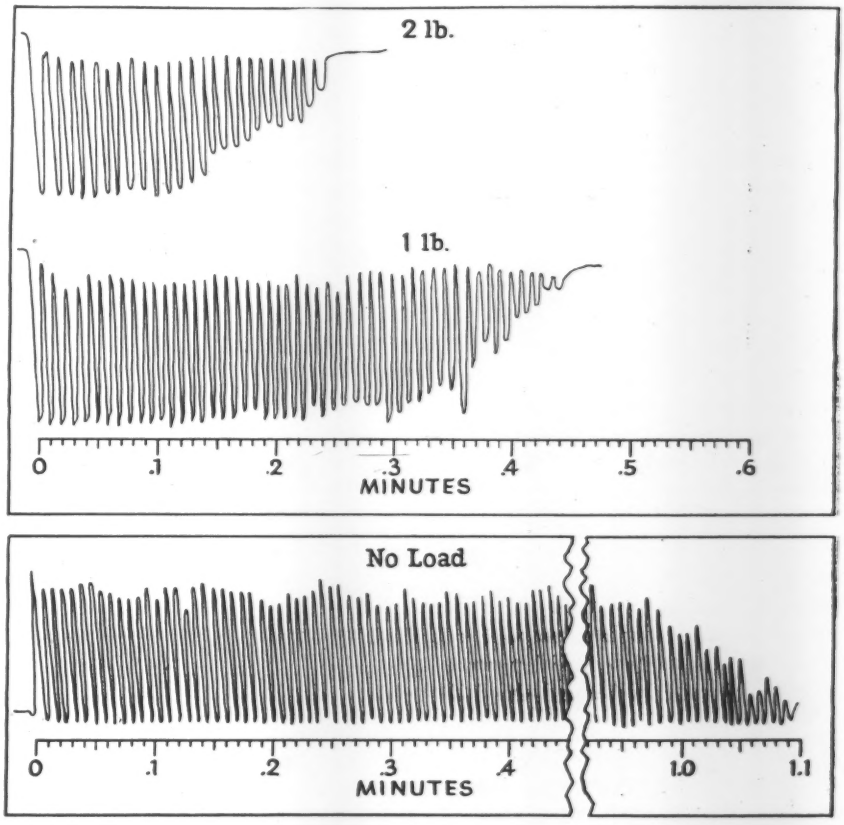
An experimental procedure was devised to obtain the energy expenditure for a given task without the use of motion pictures, hence without requiring the job to be in existence. The procedure was for simple tasks because of the experimental nature of the work. The procedure was tentatively designed for movements of unloaded arms with the shoulder remaining at one point, because it was not known if the method would work with even such limitations. In general, the experimental procedure used for the biomechanical determination of the energy expenditure was as follows:

Since the task may be stated, and a sketch of the workplace constructed, it is possible to determine the distances the hand will move from one point to another, a time may be assumed for the movement. Knowing that the movement of the hand will consist of time spent in, first, acceleration, then constant velocity, and then deceleration, the velocity of the hand at given increments of time and distance traveled can be computed. Certain physical measurements can be made with a subject, either standing or seated as will be required during the actual operation, placed before a very sketchy work place "mock-up".

Knowing the physical measurements of the operator and his relation to the work place it is possible to project the upper arm into various planes. Knowing all the angular velocities found from the projections of the upper arm, the angular velocity of the upper arm at each increment of time can be calculated. The linear velocity of the upper arm at its center of gravity, and at the elbow can be determined from the angular velocity. Knowing the velocity of the hand and the velocity of the elbow, additional calculations can be made to determine the velocity of the lower arm at its center of gravity. The translational and rotational energy of the upper and lower arm can be calculated from the velocity of the upper and lower arm at their respective centers of gravity. From the translational and rotational energy of each arm, the kinetic energy of each member can be found for each increment of time. The total increases in kinetic energy of each arm represent the energy expended by the arm in reaching the various levels of kinetic energy. This energy expenditure can then be converted to horsepower expended for the movement of the unloaded arm from one point to another point.

BASIS FOR COMPARISON

The experimental procedure was applied to seven conditions (or methods) of one task. The conditions and the task chosen for the application of the experimental procedure were the same as the conditions and task of an experiment performed to determine, on a time basis, the optimum condition (or method) of performing the task. This experiment is described by M. E. Mundel, C. W. McFarland, G. Nadler, and L. Margolin, in "Determination of Basic Design Data for Control Type, Location and Arrangement: Part I Selector



Ergograph Record showing decline in the amplitude of finger motion.

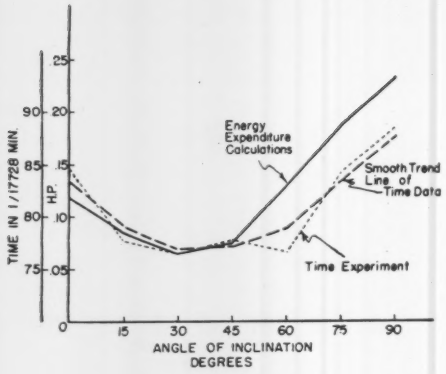


FIGURE I

Switches." Special Devices Center, Office of Naval Research, April 14, 1948.

Using above experiment for comparison purposes, it was possible to check the results of the new experimental procedure. The task was simple and required the right hand to move from a button to a selector switch, turn the switch 30° clockwise and move back to and depress the original button. The switch was mounted on a smooth surface, and the seven conditions of the task were the angles from 0° to 90° in 15° increments formed by the work surface and the horizontal plane.

The general conditions of the time experiment were kept the same in the calculations of energy expenditure only to make certain that the comparison of results would be on an equitable basis. In the time experiment, the energy expenditure of the movement was kept constant from condition to condition by having the subjects work at maximum pace. Since kinetic energy is related to time, the only way energy expenditures could be compared was to assume the time for the movement to be the same for each condition in the calculations of energy expenditure.

RESULTS

The results of the time experiment indicated that the optimum condition (angle of inclination) was 30°. The data were checked by analysis of variance and the differences in the amount of time from condition to condition were found to be significant beyond the 1% level of confidence. The results of the application of the experimental procedure to the conditions of the task indicated that 30° was the optimum angle of inclination. (See Figure 1).

RESTRICTIONS

The procedure, as developed, is restricted in use by the experimental limitations of:

1 Application to the arms only
2 Movement of the arms
3 Unloaded state of the arms
4 The assumption that the shoulder remains at one point during the movement
5 The assumption that if the height of the elbow above the work surface decreases from its height at the beginning point of travel to its height at the end point of travel, it will decrease in a manner described by the arc of a circle.
6 The assumption that any positioning of the hand and/or arm for future activity at its destination will be sufficiently similar from condition to condition to have a negligible effect on the differences of energy expenditure.

Future research will either substantiate this assumption (item 6), find the exact relationships, or determine the correct calculational procedure.

SUMMARY

With these limitations, the following conclusions can be drawn:

1 The procedure successfully predicted the optimum motion pattern for a given task, inasmuch as the results matched the results found by experimentation performed on a time basis with the same task.
2 There seems to be a relationship between the amount of time used to perform a task at a given pace level and the energy expenditure involved in performing the task.
3 It would appear feasible to extend the biomechanical approach to cover more complex activities.

THE "BIOMECHANICAL" APPROACH

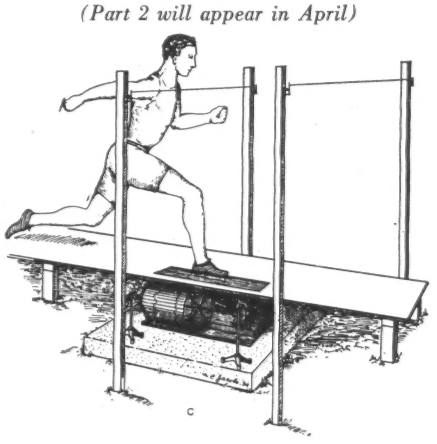
Although the procedure and principles of motion study were the prime considerations of this work, a new light on time study possibilities has been provided. The rating of performances has consistently proved to be a hefty thorn in the side of scientific management. It seems possible that the entire concept of time study could be changed by the biomechanical approach to work. Time, in itself, would no longer be the basis of industrial standards.

Any job, after more research in biomechanics, could be evaluated in terms of its energy expenditure by following, in general, the procedure as discussed above. Further physiological investigation and mutual agreements of interested parties would determine a definite amount of energy expenditure per unit of time as a standard.

It is possible that some of the present difficulties of time study might be eliminated with the introduction of a system based on scientific principles. Sources of error can be numerous in time study. Outstanding is the attempt to multiply time by a number representing an estimate of a variable, which may or may not have a direct effect on time, to arrive at a work load for a job. Theories have been evolved to eliminate time from the determination of standards, but most of them seem to be a collection of ideas which seem to have little or no scientific proof. These theories fall into the same category as the variables used for rating purposes.

Authors have reported systems which purport to arrive at correct methods and time standards before a job is in existence. This is the true goal of motion and time study, but the systems have pitfalls in the above-mentioned seemingly unprovable assumptions. Energy expenditure calculations, as described herein, represent an approach to the goal of motion and time study based on facts and principles that are scientific, not empiric in nature.

(Part 2 will appear in April)



Apparatus for recording components of foot pressure against the ground.

Management Control

by ALEX W. RATHE

Associate Professor of Administrative Engineering,
New York University

What is behind the growing trend towards "Management Control" programs? A penetrating summary of the factors that improve management and some practical guidance on the fine points of applying its principles effectively.

NO pilot flies a plane without navigating instruments which guide him to his target. The Executive's Instrument Panel which guides progressive business to its target is Management Control.

CONTROL PRINCIPLES

"Control" of operations is good only when it helps operations. Does this not mean . . .

1. That control must give warnings of obstacles which lie ahead and that it should map out plans to avoid them.
2. That control must examine past and present activities so as to search out weaknesses which can be eliminated in the future, and that it has to ascertain the results of its planning.

The first point covers planning activities. They determine what *should* take place. The second indicates control activities. They determine what *did* take place. Separated, each is vulnerable. Grouped together, planning and control work is a powerful managerial instrument. It operates in a cycle. Plans are formulated, tried out, and checked; their results influence new plans which are put into operation and tested again; and so forth in a continuing chain reaction.

When properly organized, these techniques produce such potent results that they have been called "the new look in management." In less commercialized appelation, the interplay of planning and control has become known as Management Control.

We need both planning and control in this task of improving management. The primary reason is perhaps that control is most effectively exercised before something goes off the beam; for that, you need to know what should take place —what the plans are—so as to be able to guide matters there.

Furthermore, it is difficult to separate planning and control in many instances. The budget, for example, is a planning tool; it sets forth the schedule of operations decided upon. But marking against the columns of "budgeted" data the corresponding figures of "actual" performance brings forth the control aspects of the budget; this is particularly so when there are added comparable data on operations during the previous season or on activities in some other place.

Time standards serve both planning and control because they facilitate planning while comparison of actual with standard time serves the control end.

THE PLANNING PHASE

The planning phase of management control determines how operations should proceed. This is a formidable job; depending upon individual circumstances, it varies considerably in scope; Figure 1 shows a relatively wide range. So many of the planning activities are problems which the line executive, in the pressure of every day operating responsibilities, is forced to postpone for the proverbial tomorrow which too often never comes. He usually welcomes the assistance in these projects of a staff agency such as the Controller's Division which will be sketched here.

Planning has two segments. First, the operating program must be designed and secondly, managerial tools are to be developed which permit this program to be executed in the best manner.

With policies as reference points, long range plans and short term programs are designed. Long range plans peer three, five, or ten years into the future. They cover any and all phases of corporate activities — from ideas for the development of new products in the laboratory next door to consideration of the population's birth rate in the most remote of the 48 states.

For the short range program the foundation is laid by market analysis which ascertains the market potential. Sales forecasts calculate the probable share of this total demand which the company can expect to fill. This estimate is reconciled with the results of a separate study of economic conditions and then, the corporation's overall short term program evolves, with its component engineering, manufacturing, marketing, and other divisional programs.

IMPLEMENTING THE PLANS

The logical sequence to the design of policies, plans, and programs is for the Controller also to suggest the means by which they can best be carried out.

First among them is provision for a continuing study of the organization structure of the firm. This function is assuming ever more vital rank. Recent years have brought significant progress in, and acceptance of, our knowledge of organization engineering and the degree to which it can contribute mightily to the efficient operations of any enterprise. There is justified hope for even greater headway from current organizational research with its emphasis on psychological and sociological aspects. Beyond that, however, it is through skillful organizational arrangement that management control itself is becoming effective.

Next come the particular contributions which systems and procedures make as the mechanism through which management operates. They provide the specific road maps along which produc-

Adapted from a paper presented at the Annual Meeting of the *American Statistical Association*, in a joint session with the *Society for the Advancement of Management*, in New York on December 29, 1949.

tion, sales, and all the other activities proceed in pursuit of the objectives set for them by company policies and the corporate operating program.

When we follow operations to the individual job, methods reign supreme. Here, detailed studies determine the "best way" of performing a task — an indeed fundamental contribution to planning. No less significant are standards; some put a time tag on the best way and thus provide a time table for the road map; others set marks for materials consumption and cost items.

THE CONTROL PHASE

The first control task is to locate those spots in all parts of corporate activities which compile significant factual data on performance and to synchronize them into one overall management control network.

Financial data come from three main reservoirs. Cost accounting is the custodian of the expense records of operations, parts, products, departments, or other subdivisions. The second carrier of financial information is the budget. Its clear-cut schedules, listing the plans for all important financial transactions, represent the operating program in monetary terms. Financial auditing is the third of the contributories to the stream of financial data.

All other data, trends, events, and additional facts should be collected, recorded, and analyzed by a statistical group;[1] its pipelines connect with production control, payroll, timekeeping, purchasing, quality control, sales, and many other records.

After all these control data are collected, they are analyzed.

The really responsible part of the job is the evaluation of these findings. This is where the management control group meets its acid test. Data and facts must be interpreted in the light of existing circumstances. They should be evaluated from the point of view of overall management. And most importantly, they have to be examined in their relation to, and influence upon, one another. Thorough consideration has to be given to economic, human and public relations as well as many other aspects. Main emphasis does not rest so much on analysis but on synthesis of the components of the findings.

Responsibility for management control activities of this type cannot be lodged in a clerk, a junior engineer or accountant, or a technician. It is a professional assignment. Progressive management knows that it jeopardizes its own effectiveness unless it places an executive of broad caliber in charge of management control.

The results of the evaluation are usually compiled in reports. They are also often presented to the executives concerned in less formal fashion, somewhat in the manner in which a physician would discuss with a colleague the results of his diagnosis and experiments. Whether it is the counsel of the doctor or of the controller, it is entirely within the individual's discretion to accept or reject the advice offered.

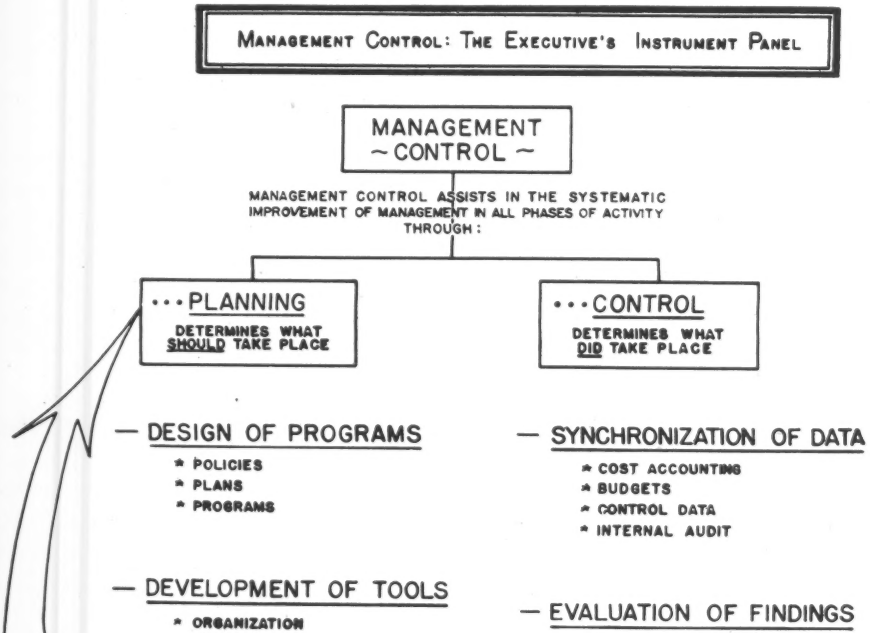
The findings are finally channeled back to the planning group so that they will be considered in future developments, policies, plans, and programs. This "feed-back" completes the cycle of management control work.

The bird's eye view shows at once that management control is not synonymous with economics, statistics, accounting, or engineering. It contains elements of all of these, and much more because, as the Executive's Instrument Panel, it gives an account of all operational aspects in all phases of the company.

ORGANIZING FOR CONTROL

Not so long ago, the control function in business was concerned primarily with financial considerations. With the ever-increasing scope of our business life and the steadily growing complexities and responsibilities of management, it was only natural that the control scope had to expand beyond narrow confines. There were a very few isolated instances in the past when foresighted executives[2] pointed out that limiting the scope of the Controller prevented the wider service which he is capable of rendering.

However, it remained for relatively recent years to provide some answers to these isolated challenges. And it has been primarily through skillful organizational design that the objective of management control has come closer to being accomplished. Any organizational project presents psychological



[1] For details, see *Alex W. Rathe, "How to set up Management Controls"; Funk & Wagnalls Company; New York; 1948.*

[2] *See Henri Fayol, Mary P. Follett and Charles C. James*

problems; if it aims at something psychologically as distasteful as "control," the problems multiply. Therefore the first requirement for organizing the management control function will always remain that the solution is acceptable on the psychological front.

That is why management control is usually decentralized. In this manner, closer relationships become possible and greater interest in the work is generated because everyone sees what he contributes and what his contributions mean in the larger picture. The nearer you get to the specific operation, the more effective is your control and the more readily are control findings accepted.

Decentralized, each division, store, or plant has its own management control staff, its own subsidiary instrument panel. Here are performed all planning and control activities for the group. A selection of typical assignments for the functional divisions of a manufacturing company might for instance be . . .

"PROGRAMS"

Marketing ..... sales forecast
Manufacturing .. manufacturing program
delivery timetable
production control schedule

"TOOLS"

Finance ..... accounting procedures
Production ..... methods

"DATA"

Engineering ..... development cost
divisional budget
other engineering data

"EVALUATION"

Personnel ..... morale survey

This then leaves the Controller with four main spheres:

First, he has to connect the subsidiary instruments in the various divisions into an overall corporate instrument panel from which top executives and division managers alike obtain their reading on the course and the performance of the enterprise as a whole.

Second, he handles projects of mutual concern and acts as a clearing house for the exchange of data, information, and advice on problems of common interest to several divisions (such as corporate organization structure).

Third, he is responsible for corporation-wide problems which affect all divisions (such as economic studies, overall policies, etc.).

Fourth, his staff is available to all other divisions as the company's own management consultant whenever such services are desired; and this is usually the case with a great variety of problems.

CONTROL IN PRACTICE

As witnesses for the effectiveness of management control we find many companies whose reputation and success has often been enhanced by being among the first to try and profit from new and progressive ideas. Pioneers in the gradual development of management control concept and techniques have been such firms as United Airlines, Koppers Company, ATF Incorporated, Hudson American Corporation, to name just a few.

Today, the roll-call of organizations with successful management control installations is growing at a steep rate. As in other fields, the arrangement and scope of the work, even the name under which it is carried out, varies greatly.

But three considerations are paramount if management control is to be successful:

One, planning and control activities must be recognized as components of one task, that of managing; they are not a tool but a part of management.

Two, the profitable functioning of management control depends on reliable inter-connection not merely of some but of all planning and control work wherever it may be carried on in a firm.

Three, decision by factual data is to be emphasized, rather than a hit-or-miss approach, because you can't get the better way of tomorrow until you have all the facts of today.

Mr. Al N. Seares, Vice President of *Remington-Rand*, told me: "It took us five years to develop the control factors which we are using. Today, we consider them one of our most priceless assets." What causes this and other encouraging endorsements? It is the practical nature of management control and its reliable features.

Management control reinforces the executive whom it serves. It multiplies his effectiveness. But it has no command authority. It is confined to the authority of ideas, findings, and suggestions. It does not give orders. It must *sell* its recommendations. Or better still, it must present its thoughts in such a form that the operating executives want to *buy*. Good management control work has proved itself as a potent integrator and powerful catalyst of teamwork because no other spot in all industrial and commercial activity has as many possibilities to demonstrate the complete interdependence of one part of the enterprise upon the goodwill and performance of all the others.

Management control backstops management. In its planning phase, it determines the atmosphere — economic and otherwise—within which operations are expected to be carried out. It lays plans. It sets targets. It suggests the best road map and time table through which the executive can reach his target.

And then, in its control phase, management control tells him what kind of a job he really did. It helps uncover errors made while pursuing the plans or deviating from them. It gives this information in clear-cut facts and figures. There is no hunch, no guesswork, no opinions. Management control is *fact* not *man* control.

In addition to supplying factual information on all phases of operations, management control evaluates these facts. It gauges actual performance against plans. It interprets results. It adds recommendations on how to prevent weak spots and avoid pitfalls in the future. Finally, it supplies practical ideas on how to proceed to make an ever-better record of profit and service and it channels them back into the planning phase.

As William V. Hollander aptly put it: "Management control is management's nagging conscience that cannot be quieted until it has challenged present results and lighted up new paths to greater success." Management control's sole objective is to help managers improve management.

Management's Common Denominators

The Evaluation Table in the Management Audit

By JACKSON MARTINDELL

President, American Institute of Management

Here is a concept of areas of decision and reasons for their relative "weight" in the evaluation table.

ANALYSIS of the management forms and practices of America's leading corporations brings into perspective those areas of management decision which are common to all companies, in no matter what industry they are engaged. Ten in number, these common factors embrace the whole relationship of management to the company it controls, to its stockholders, its customers, its employees and the nation at large. Each corresponds to a phase of management activity capable of being examined separately, and therefore of being independently appraised, but also, considered collectively, of expressing and grading the management function as a whole.

They do not correspond to the formal structural subdivisions which the term corporate organization normally implies. Nor do they coincide with the special function of each and every separate officer of the corporation. Instead, they represent the activity and motivation of the whole management group as expressed in measurable quantities. They are functional divisions, not formal ones, as much concerned with the relationship, through practice, of the corporation to the society of which it is a part as with that of the men within it to itself.

The major problem is that of weighting. After studying some 2,000 leading corporations we have arrived at the following:

MANAGEMENT EVALUATION TABLE

	Maximum Attainable Rating
Economic Function	400
Corporate Structure	500
Health of Earnings Growth	600
Fairness to Stockholders	700
Research and Development	700
Directorate Analysis	900
Fiscal Policies	1100
Production Efficiency	1300
Sales Vigor	1400
Executive Evaluation	2400
Total (Theoretic Perfection)	10,000

Minimum requirement for "Excellent" rating—7,500 points

The individual ratings are arrived at after examining and grading the answers we receive to our Audit Material. This consists of 301 basic questions, many of which are subdivided into great detail.

It should first be noted that, although the general categories are relevant to every publicly owned corporation, the specific questions which a management needs answer must necessarily vary, company by company, in accordance with the emphasis of its business and the peculiar genius which is called for in order that the company may keep abreast of competition.

NATURE OF THE MANAGEMENT PROBLEM

When first the members of the Institute realized this fact, it seemed to some that this would preclude a universally applicable questionnaire and would make impractical any weighting system, no matter how refined. Further examination of the problem, and the experimental application of various measuring systems to the various spheres of corporate activity, quickly convinced us that this is not so. Even dissimilar enterprises, engaged in the most remotely connected industries, meet group problems of a broadly similar nature which, differ as they might in detail, correspond closely in the nature of the problems to be solved. The management problem is still the management problem no matter how great its concentration upon specific aspects.

The weightings we have devised seem to us to be invariable in the case of the publicly owned manufacturing company. Only when a company is privately owned is it necessary to substitute a new category of evaluation for that which we normally employ. Even then, the substitution is as much semantic as actual. I refer to the category, *Fairness to Stockholders.* In the company owned and managed by one man or a small group the word *fairness* no longer applies. There is no possibility of the sole owner discriminating against himself out of malice—although he may do so out of lack of foresight. The functional phase of the problem is unchanged, however. What amount of dividends to distribute, for example, is not, in our opinion, a matter capable of abstract determination but arises naturally—and

mathematically—out of the actual state of the balance sheet. *Not,* I must add, out of the current earnings statement. Moreover, the general trend of economic evolution is towards the joint-stock company, especially for the growing organization. Management practices as regards distributions and the like in the case of wholly private ownership must usually be regarded as preliminary steps towards the securing of public financing; therefore, as initial indications of probable short-term future relation to stockholders when such are invited into the company.

The point at issue, in such a case, is not how well the individual owner has fared under his own guidance but how clearly he has differentiated between his own personal self-interest over the short run and that of the company he controls, and in this case owns. Exactly the same problem faces the professional members of managements empowered to reach decisions over the conduct of companies belonging to others. Dissociating themselves from ownership, and approaching the problem in a fully rational and unbiased way, they must, periodically, counterpose the self-interest of their nominal employers, as stockholders, with that of the company itself regarded as a continuing institution. The problem, then, is not to set up arbitrary standards of fairness but to find out just how clearly a particular management has reasoned over the real relationship between company and owner. It should be commented that, in our experience, only the very finest managements have as yet given this matter any serious thought.

CONTINUITY OF DIRECTION

Our major categories are worthy of examination seriatim:

EXECUTIVE EVALUATION: Out of a maximum possible rating of 10,000 points, 2,400 have been accorded to executive evaluation alone. This is because proper rating of the human personalities in a management group must make it impossible for a management to be rated excellent if the continuation of its members in office seems tenuous or uncertain. The question is one of immediacy. If the immediately future composition of a management group is unpredictable, the present quality of that management cannot be gauged unless by the term management we mean other than what I mean—the continuing exercise of the directive function.

The minimum requirement to qualify as excellently managed, according to the standards of the American Institute of Management, is 7,500 points out of the theoretical 10,000 which perfection alone could earn. Since perfection cannot be attained and since even minor defects must compel the loss of at least 200 additional points in any company whatever, loss of 2,400 points for Executive Evaluation in a company where serious management disputes have arisen, makes it impossible for such a management to qualify for a high rating.

In one specific instance, so serious a dispute had arisen between the chief executive and his associates, at the time of our initial evaluation, that one simply could not know who was likely to be in control of the company a year from that date. This fact caused us to deduct temporarily 2,400 points from the rating. Loss of 100 points in *Economic Function* and 100 in *Health of Earnings Growth* brought the company below the requisite level of 7,500.

This management dispute caused serious dissension within the Board of Directors, leading to threats of resignation which later materialized. We were compelled, therefore, to subtract a further 900 points because even the immediate future of the Board itself was in doubt. This reduced the score to far below our required minimum. Even without this latter reduction, however, it would not have been possible for this company, in its state of internal turmoil, to qualify as excellent since its maximum possible rating under the circumstances was 7,400, or 100 less than the required minimum. Today, by contrast, the same company stands high upon our approved list. The internal dispute has been settled, restoring stability to both the executive group and the Board of Directors, 2,000 points have been added to our initial Executive Evaluation and 900 points to the Directorate Analysis, giving a rating of 9,000 points to the company as a whole, or 20% above the minimum for excellence.

ART OF SELLING

SALES VIGOR: is our next most important division, rating 1,400 points as compared with 2,400 for the human personalities composing the executive group and 1,300 for production efficiency. Why do we consider sales vigor as warranting a higher rating than efficiency? Because the basic principles of scientific production were long ago worked out, because they have been the subject of intense and prolonged study by thousands of recognized experts, and are therefore available to any company willing or able to hire competent production men. That is not the case with selling. Production deals with tangible, measurable, verifiable and predictable data. Selling does not. It calls for a form of genius and insight which richly rewards its possessors but is, frankly, seldom met with.

The art of selling, the capacity to distinguish between stable, dwindling and growing markets, the ability to sense the character and limits of each regional market, and a full knowledge of what the customer requires, and is willing to pay for this satisfaction, command a combination of both routine and inspiration. When these are encountered, and when they are formulated into systematic method, the individual corporation makes remarkable progress. Furthermore, it is in the province of selling that the ethical relationship of a company to the general public is expressed. Sales vigor deservedly takes precedence over all evaluation factors other than the executive group itself.

USE OF CAPITAL EQUIPMENT

PRODUCTION EFFICIENCY: The basic audit material consists of 301 major questions to management. Of this number, 77 relate to production. In essence these summarize a company's relative standing within its industry so far as direct costs are concerned. It is a basic principle of the American Institute of Management that such costs are not a mere mathematical consequence of the technical capacity of the production heads and the machinery they have installed. The handling of the labor force is a paramount factor. Even somewhat inferior equipment will turn in superior profits if the men who work it are contented and have a sense of mutuality with the company which employs them. We hold, nevertheless, that mechanical efficiency is a prime indicator of management quality. In the best companies,

harmonious labor relations and a high standard of technology go hand in hand.

In many companies, we have discovered, there is a lack of understanding that efficient use of capital equipment must rest upon an understanding of what constitutes efficient use of capital itself. In appraising production efficiency, therefore, we find ourselves reaching into financial consideration. This may seem remote from engineering principles but, from the management viewpoint, is so closely allied a factor as to be inseparable. In today's state of prices, for instance, prospective depreciation charges in future days of lower installation costs (if they ever materialize), must be weighed against direct man-hour costs of production upon a piece of proposed equipment.

On the other hand, a company which regularly leads its industry in technological innovations and which exploits its innovations to the full, may seem to follow policies of a daring which more conservative companies naturally hold suspect. The significant fact to us is not that they seem daring but is that they are policies, not merely opportunistic results of the pressure of competition.

That is what the questionnaire is devised to discover and what our rating system finally expresses.

FINANCIAL CONTROL

FISCAL POLICIES: It will be noted, with a weighting of 1,100 points, outweighs both the *Directorate Analysis*, with 900, and *Research and Development* with 700. Too many top managements, in our opinion, are still unaware of how long continued can be the difficulties in which a company finds itself as a result of a single moment of financial laxness. In my "Scientific Appraisal of Management" I cite one leading company which committed a grave financial error in 1920 and was consequently beset with financial difficulties throughout the following twenty years.

In this instance, laxness is perhaps not the appropriate term. The officers simply failed to develop a sound theory of corporate finance. They lost sight of the fact that, at every separate stage of the trade cycle, there is, for each separate company, an optimum ratio between the type and quantity of corporate assets held. As a result, their finances grew unbalanced. The officers ceased to be in control of their finances and therefore lost control of the company.

DIRECTORATE ANALYSIS: receives 900 points or less than 40% of the weighting given to Executive Evaluation. The 19 questions on which this judgment is based sum up the type of dominant board member in the subject company, his background and interests, his training and conversance with the business, and his other financial connections. They are also designed to contrast the form of Board organization with that of others in the same industry . . . and especially so where minority interests, or main customers or suppliers, are strongly represented among the directors.

FAIRNESS TO STOCKHOLDERS and RESEARCH AND DEVELOPMENT: each receive a rating of 700 points. The reasons for this are, first, that both are concerned with a blending of the practical and the ethical. It is not only unfair to treat stockholders badly, it is stupid. They are the source from which new equity capital must be raised when needed. In just the same way, a company's customers must never be led to feel that what is new and interesting in the line of products they buy can be expected to come from some source other than the subject company. Managements which fall down on one of these points usually fall down on both. That, at least, is our experience.

The other three factors are sufficiently self-evident as categories to require no elaboration here. Their essence is historical. They trace, and express mathematically, past changes in the economic want supplied by the organization, the extent to which and the way in which its earnings have grown especially by comparison with its direct and indirect competitors, and the final structural form which the company has assumed. This latter point evidences to us the degree to which the management has grasped the overall nature of its management problem and the mechanisms it has devised to ensure a more or less harmonious operation of the group in endeavoring to solve those problems.

ADAPTING THE AUDIT

The questions underlying each of these ten divisions are definitive. They nevertheless require supplementing on occasion. One company, for example, derives almost 50% of its net income from royalties on products developed by its own chemists and technicians. It is a unique company and meets no general competition. It was therefore impossible for us to reach a final rating until we had radically altered the questionnaire to make it more applicable to the immediate situation.

Significantly, however, the one paramount weakness in the company was revealed by the answers received to the preliminary audit material. This weakness lay in the company's fiscal policies, which had been such that it had never accumulated sufficient funds to begin direct exploitation for its own account of some of its most promising products. Two years ago, fresh money was introduced into this company, and a new approach to the matter of corporate finances was worked out. The company is now enlarging its own manufacturing activities and already has benefited significantly.

MAINTAINING OBJECTIVITY

Two final words: In evaluating any company, we do not rely exclusively upon information or opinions expressed by company employees in the higher echelons. The opinions of junior executives, of men at the machine, and of competitors are of prime importance. In devising our formulaic approach, indeed, we first asked companies in many industries who they thought to be their best managed competitors, and why. That information, spread over a large enough sampling of companies and industries, constituted our initial approach to the question. In just the same way, opinions of competitors, especially as to selling policies, are often decisive in influencing our judgment.

Emerson Trophy Standings
Chapter Performance Award Plan
As of January, 1950

CHAPTER	TOTAL
Cleveland	2232
Washington	2145
Philadelphia	2104
Pittsburgh	1227
New York	943
Chicago	854
Cincinnati	845

Executives Evaluate Administrative Conferences

By Dr. MARTIN KRIESBERG
United States Bureau of the Census

The Conference as an administrative tool goes under the "research microscope" for objective scrutiny.

WHILE the use of conferences in business and government is widespread, conference techniques have not been examined as scientifically as other phases of management. The Conference Research project at the University of Michigan is investigating the effects of various committee procedures, tackling the problem of committees from an operational rather than a structural viewpoint.[1] The inquiry aims to secure some understanding of the basic nature of conference processes, so that conferences may be made more valuable for both participants and organizations. The research project gained orientation by conducting a survey of current conference practices before direct observations were made of conference groups in action. The results of this interview study among operating executives are reported here.

The study obtained knowledge about decision-making conferences, as they are seen by the executive who calls them. The organizations from which the executives were interviewed met these standards: they had been operating for more than one year with a stable internal structure, employed at least 25 people, and had an operating budget of at least $100,000 per year. On the whole, they were organizations of some significance in our national economy or governmental structure. Twenty-five manufacturing firms, 25 federal government agencies, and 25 service organizations, such as libraries, trade associations, and public utilities, were chosen as the basis for the study. Information was obtained during an interview in each unit with a top-level executive, who had had wide experience with staff conferences and committees.

RESULTS OF INTERVIEW STUDY

The study revealed valuable information about conference procedures and practices currently used by executives. Data was obtained about the purposes for which meetings are called. An estimate of the intensity with which conferences are used in modern industrial and governmental organizations was made. Executives gave their opinions on the relative importance of particular factors in obtaining successful conferences. They also disclosed the advantages and disadvantages they experience in using conferences. Most intriguing was the discovery that many executives emphasize the value of conference procedures which contribute little or nothing to the purposes for which they call their meetings.

The executives report that their administrative conferences serve two overall purposes: to communicate information and to aid in decision-making. Administrative conferences were reported to have been used as much for decision-making functions as for communication.

When quizzed about why they held conferences for decision-making, over 70% of the executives said their primary reason for calling such meetings was to insure successful execution of the decisions reached. Further probes elicited the facts that 86% of the executives had considered the possibility that a conference might make the decisions more acceptable to the participants and 79% thought a conference would spur them to execute the decision. Implicit in this pattern of responses is the view that the purpose of conferences is to "sell" decisions to conference participants. This interpretation is reinforced by the fact that in a majority of the case-conferences the decisions were implemented by both participants and leader. Only 15% of the executives said they called meetings because they felt that decisions reached in conference would be better owing to group discussion of the problem.

In answer to direct questions as to whether the respondent felt a conference would give resulting decisions more weight with officers outside his jurisdiction and would be less open to criticism from persons not at the meeting, some 60% of the executives replied affirmatively. Thus, although the executives did not spontaneously report using conferences as a "covering" device to avoid criticism and to add weight to the decision, many acknowledged that such purposes were being served.

TIME SPENT IN CONFERENCES

The executives in the three types of organizations studied, spent an average of 10 hours each week in conference. This constitutes almost one-quarter of their working time. Two factors are associated with the amount of time an executive spends in conferences: the executive's role in the organization and the size of the organization. Men in staff positions tend to spend more time in conferences than do line officers. Staff officials frequently deal with problems which cross lines of authority. They often turn to conferences as a means of

[1] A description of the employment of boards and standing committees in 31 "blue chip" companies was undertaken as a small part of a larger study immediately prior to World War II by the Stanford University Graduate School of Business. The report on committees is broad and general. It is occupied almost entirely with the relation of the formal characteristics of such conference groups to the organization's administrative structure. Holden, P. E., Fish, L. S., and Smith, H. L. *Top-Management Organization and Control.* Stanford University Press, 1941, pp. 239.

persuading others to pool authority to handle the common problem. Executives in larger organizations (those with more than 1,000 employees) tend to spend more of their working week in conferences than those with fewer employees. Larger organizations probably have more complex problems of coordination requiring meetings to expedite communication and control.

CONFERENCE PROCEDURES

Information about current conference procedures may be gained by summarizing reports of the 75 actual decision-making conferences included in the study. The typical administrative conference includes from 5 to 6 conferees and lasts from one to two hours. Conferences with more participants were found to last longer than the smaller ones.

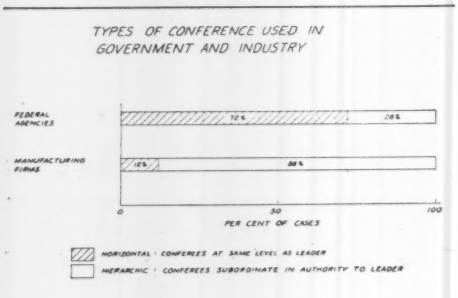
Approximately two out of three executives reported using an agenda, when this term includes such informal devices as rough notes made preparatory to the meeting. Almost all of the horizontal conferences employed an agenda, while less than half of those of hierarchic structure did so. This difference may be explained by the authority position of the conference leader. Leaders of "horizontal" conferences, frequently lacking adequate authority, rely on such devices as an agenda to assure their direction of the session. Agendas were used more frequently in larger meetings than in those with few participants. Of the executives interviewed, 65% notified the conferees at least 24 hours prior to the meeting of the problems to be discussed; 17% made no reference to the subject matter although notifying the participants of the time and place of the meeting.

LEADERSHIP PATTERNS

When queried as to what went on during the meeting itself, most of the executives replied by describing their own leadership techniques. On the basis of how they started and terminated the meeting, and how they guided the process during the conference itself, it is possible to differentiate three general styles of leadership — the *demanding*, rather autocratic leader, who makes his views known and arbitrarily seeks confirmation of them from the group; the *directing* leader, who guides the group to its decisions; and the *deferring* leader, who allows the group to go where it may. Almost 70% of the respondents could be classified in the middle category. There was a clear relationship between the type of leadership and the structure of the conference group. In hierarchically structured groups, the executive tended to exercise more rigid control over the meeting; in horizontal groups, the leader played a much less dominating role. This difference in roles reflects the difference in authority between conference leaders of hierarchic and of horizontal conference groups.

Before a conference group reaches a decision, there may be serious disagreements. Such differences may be settled by a decision of the leader with or without regard to individual differences, by compromise among the participants themselves or by simple deferral of the issue, or referral of it to an outside authority. Of the cases reported, almost equal numbers were settled in each of these three manners. The relationship of the leader to the other participants apparently affects the manner in which differences are resolved. In conferences led by a staff official, differences are usually settled by referral outside the group; in those led by line officers, differences are settled either by the leader himself or a group compromise. However, almost 40% of the executives reported there were no issues in the particular meeting upon which it was difficult to reach agreement. In only 3% of the conferences reported was there failure to reach some kind of decision.

The manner in which the group decisions became crystallized varied among conferences. In some 12% of the meetings the leader stated his understanding of the group's conclusion and then inquired of each participant to determine if he concurred. In 62% of the conferences, the leader made only a general inquiry as to whether his statement of the group's decision was agreeable. In some 16% of the meetings, the leader considered his statement of the group's decision as final and did not refer it to the group. The manner in which the group's decision was crystallized closely followed the executive's leadership style. The demanding and directing leaders tended to make only general inquiry of the participants as to their understanding of the group decision or none at all.



IDEOLOGY ABOUT CONFERENCES

Most of the executives interviewed felt that what occurs in a conference is primarily the responsibility of the leader. When asked what they thought were the most important factors in obtaining a successful conference, 86% of their replies were in terms of factors which ordinarily are controlled by the leader before the conference begins.

A summary of these factors indicated: 19% believed the leader most important; 35% considered well-prepared participants concerned with the problem to be discussed most important; and 30% felt clear problem formulation was most important; while 14% gave other reasons.

An attempt has been made by the author and Dr. Harold Guetzkow to present a comprehensive theoretical framework of the role of conferences in the administrative process in the paper, "The Use of Conferences in the Administrative Process." *Pub. Admin. Rev.* (In press)

When probed specifically as to what factors would determine a meeting's success once it had begun, 95% mentioned elements in the problem-solving activity of the meeting, such as "keeping the problem in focus," and "maintaining a free exchange of views." These are viewed primarily as a responsibility of leadership. Only occasional mention was made of need for wide agreement on underlying purposes, or the need for clear communication among the members. Executives apparently assumed that participants came to the meeting with the same end in mind and would "speak the same language." Even fewer executives mentioned factors related to interpersonal relations or the self-needs of the participants. The paucity of comment on this score clearly reflects the executive's conception of conferences as instruments serving only his own administrative needs.

A detailed analysis of particular procedures designated by the executives as important in obtaining a successful conference, shows that many disagreements exist among them. For instance, the executives varied widely in their estimate of the "proper" number of persons which makes a conference successful or the calibre of people who should be present.

Further information about their general ideology was obtained by asking respondents to cite the advantages and disadvantages they had experienced in using conferences to reach decisions. The 75 executives mentioned more advantages (total of 187) than disadvantages (total of 107). There is widespread agreement on the advantages of conferences in getting an exchange of views and thereby helping to produce a better decision, and as a means of increasing motivation and thereby improving decision execution. The single disadvantage upon which the executives agreed was that conferences took too much time. However, among administrators in federal agencies several said that conferences saved time when decisions required review or clearance by a number of different departments or divisions.

This dominance of favorable reaction to the use of conferences was confirmed by the ratings the executives made of the specific conferences which they described to the interviewers. Some 90% of them evaluated the conference they described as "good" or "very good." Although the positiveness of these judgments may in part be attributed to the conscious or unconscious selection of the particular conference reported, there appears to be overwhelming satisfaction with the conference technique in decision-making.

DISCUSSION OF FINDINGS

The findings of this study of 75 executives indicate the very large role which conferences play in the administrative work in business, government, and other types of organizations. Executives in large organizations spend more than one-fourth of their working week in conferences. Yet, few administrators receive special training in the use of conferences as administrative tools. The lack of training facilities has stemmed, in part, from an absence of basic knowledge of what procedures produce good and bad conferences. Although the executives agreed on some general factors such as "good leadership," there was little agreement on specific in-conference procedures. The widespread disagreement among executives as well as among the pamphlet and textbook writers on specific conference practices, suggests the need for empirical studies on the relationship between conference procedures and results. Suggestions obtained from the executives in this interview study will be tested by Conference Research in observational studies, to check whether the absence or presence of particular factors do determine conference success.

Analysis of responses in the interview study uncovers several significant contradictions. While the respondents indicated that decision-making meetings might serve several purposes, they emphasized the use of conferences to motivate the conferees into insightful and enthusiastic decision-execution. Yet, in describing the processes which determine the success of conferences, the executives stressed the problem-solving process, rather than the motivational. For instance, the executives thought that the participants must be adequately informed on the conference topics, the problems must be kept clearly focused for them, etc. By paying little attention to the psychological factors which determine the motivational outcomes of the meeting, the executives gainsay their statement of purposes. This finding that executives are primarily concerned with problem-solving activities confirms the observation of the Stanford investigation of top-management's use of committees. The recommendation of Holden and his associates reflects the same viewpoint when they state, "Committees should be created only when it is desired to obtain the *coordinated best judgment of a particular group.*" [2]

This same confusion between the problem-solving functions and the motivational purposes of conferences is basic to a second contradiction found among the responses. 90% of the executives interviewed complained that meetings wasted time, and 78% of the respondents said other channels of communication were available for informing conferees of the decision without a meeting. Why then were these other channels not used and valuable time thereby saved? One official upon being shown the preliminary results of this study, felt he had an explanation. He challenged any executive to communicate all aspects of the decision and to motivate the 5 or 6 persons involved in implementing the decision by written directive or by personal conversation within anything like the time utilized on the conference. In judging the disadvantages of the conference, the respondents' frame of reference was that conferences are tools for problem-solving. In the total press of duties with which he is confronted, executives felt that they could have reached an adequate solution in less time by working alone. However, when judging the advantages of the conference technique, they shifted this frame of reference and viewed the meetings as a means of informing and motivating the conferees.

Although conferences are widely used and regarded as a satisfactory administrative device, it is not difficult to predict how much their value might be increased if executives were to orient the procedures they use to the goals they profess. For this reason the Conference Research observational investigation on how particular procedures used during conferences influence the success or failure of the meeting will be concerned not only with problem-solving techniques. Rather, will it emphasize those factors of human relations in conferences which are concerned with communication flow and motivational change. When specific findings are obtained, it will be possible to aid executives in adapting their conference procedures more directly to the goals they seek to attain.

This study is Publication No. 5 of the Conference Research project at the University of Michigan, sponsored by the Office of Naval Research (Contract N6onr-232, T. O. 7), under the general direction of Dr. D. G. Marquis, chairman of the Psychology Department. Grateful acknowledgment is made to Dr. Harold Guetzkow for aid in formulating this study and to James W. O'Brien, Paul C. Staake, and Berenice N. Eastman for help in executing it.

[2] Holden, et al, op. cit., pp. 60 (italics theirs).

Incentives for Cost Control*

By PHIL CARROLL

Author, Timestudy for Cost Control
Timestudy Fundamentals for Foremen

Providing incentives to make controls effective is the crux of the cost control problem.

HOW many of you realize that the modern one-for-one incentive plan results in practically constant labor costs for the work done? For example, if you pay $1.20 an hour, the cost per minute is 2¢. If the productivity is at the rate of 75 U/H or 125%, you pay $1.20 base rate plus $.30 premium, or $1.50 for an hour and a quarter of work done. The cost is again 2¢ per minute of measured work. Further, when the more skilled employee produces at a 90 U/H or 150% performance, you pay base plus premium of $1.80 for an hour and a half of work done. How could you control costs better than maintaining them at a constant level, except to have them continually declining?

Perfection is unattainable, of course. That is why I use the word "practically" to limit the meaning of "constant labor costs." We have losses in productive labor like waiting time and failure to equal standard performance. We have spoiled work and scrap. We have changes in base rate and salary. We have wide variations caused by volume fluctuations and shifts in the type of output sold. We should have methods and design changes going on all the time. Many such factors continually affect the constancy of labor cost.

Then there are variations in other costs like material and overhead exclusive of labor. Material costs change with specification, price and usage. Overhead varies with price, volume and type of product sold.

WHAT ARE COSTS?

But notice, when I mentioned overhead, I said, "Exclusive of labor." That is because incentive has to do with people. Whatever control we have, must be exercised by people. So for our purposes, costs are of three kinds. To use simple terms, they are wages, materials and charges. Wages are the payments of all kinds made to people who apply their efforts toward the interests of the company. Here we would have to include the Cadillac given to the boss as a bonus because it is an element of cost. Then, materials are both direct and indirect. And, charges are expenses like real estate taxes, depreciation and fire insurance.

Every one of these costs can be controlled. Let's start with a definition. According to Mr. Webster, control includes "to exercise a directing influence over" and "to hold within limits." These could be interpreted to mean holding a static condition. But that would be dangerous. We have to maintain a competitive position. We have to make progress. Also, we must offset rising costs. What we lose in one part of cost, we must more than save in another part. So I would like to insist that reducing costs is part of controlling. Thus, I am trying to emphasize the fact that control is action. Control must be done by people. Accounting and systems are not controls. They can only point out where to look.

USING INCENTIVES

Since people must take action to have control, then we should provide incentives to make the controls effective. That means, everyone who can affect costs should be on incentive. And everybody can help. So incentives should be applied throughout the organization. Control means also that we must have measures of what the costs should be. Therefore, standards have to be set for all costs.

First are the incentives. Second are the standards. Right away, you say that I have the cart before the horse. But think a moment. We have many types of incentives. You may think of two, namely financial and non-financial. These are not all. You are thinking of the positive ones. What about the negative incentives of all kinds? Security, pride, and advancement all operate in our day-to-day work. I might add that these are all the incentives many firms have. They are the only incentives that exist in large segments of almost every organization.

Incentive is the urge to accomplish a result. It can be positive or negative. Naturally, most of us prefer the positive type with rewards for a job well done. The reward can be a pat on the back, a promotion or increased earnings. The promotion need not carry with it a larger pay check. One incident may clarify this point. I sat on an arbitration case that grew out of insistence that a day turn job carrying a lower base rate was a promotion from night turn.

Coming back to incentives first, I frequently point out that there are many incentives more important and effective than money. But I like money rewards particularly in connection with cost control. The earnings should vary with degree of control. The payments should be closely related in time to the exercise of control.

PROFIT SHARING

It is the remoteness of compensation from both time and effort that makes profit sharing unsatisfactory from my point of view. Of course, there are more important objections. For example, most of an organization can do little or nothing about either the volume or the price factors that greatly alter profit. In the main, all they can work on is cost reduction and control. And do not be confused. One outstanding example of "profit sharing" success is in Lincoln Electric in Cleveland. But is this truly profit-sharing? I say, "No," in the light of our subject. Mr. Lincoln describes it as incentive. So it is, as I see it. The extra money paid to most of the people is an added premium proportional to earnings from incentives and suggestions.

But profit-sharing is a positive money incentive that does not have a basis of standards for costs. Nor do sales commissions and many other bonus plans.

*Cleveland Chapter
S.A.M., Jan. 16, 1950

But these incentive plans will help to reduce and control costs. That is why I believe that incentive comes first.

DESPERATION

Second in importance to incentives are standards for costs. Admittedly, we can reduce costs without any better yardstick than past performance. Many plants attempt to control them with that faulty measure. But withal, the actual costs resulting may be lower or higher than they should be. You must have standards to measure against if you want to get major cost reductions and effective cost control. You must have standards also if you are to avoid the "desperation" slashings that we see applied so often. The desperation method of cost reduction is evidence of lack of control. It is like expediting or stock chasing methods used to bolster up a production control plan that does not work. Stock chasing interrupts production. It concentrates on the "short" items at the expense of the whole output. So it is with flat per cent cost cuts ordered in desperation. This is action, yes, but it is like locking the door after the horse has been taken to the butcher shop.

Control, as we want to discuss it, is the sound, planned, stabilized type. Control, as I think of it, is the steady, day-by-day maintenance of performances against standards. If you agree, then we must have standards for people to work to and incentives to reward their accomplishments.

WORK STANDARDS

Now when I speak of incentives and standards, the first thing you think of is work standards for direct labor operations. That is as it should be. But the reason is different. You think of productive operation standards because most of our incentives are applied in the shop. Many concerns have no other standards.

But I think first of productive labor standards for a more important reason. Let's ask this question. "Why are we in business?" One answer is to make a profit. Another is to render service. To render service at a profit, we convert materials into products that customers want. The work of conversion is what we call productive labor. All the other costs result from that. All the equipment and staff is built around the conversion process. In simple terms, overhead is a rental charge for the time our skills and facilities are used.

On that premise, standards for productive operations are most important. First, those standards are necessary as the basis for the control of all other costs except direct material. Secondly, those standards measure the largest element of controllable cost.

So we need standards on the productive operations. But do not confuse what I am talking about with ordinary "piece rates." There is a vast difference. The ordinary incentive standard has in it extra details, unavoidable delays and, perhaps, some allowance for setup. Similarly, "temporary" standards are used in many places to cover faulty or non-standard conditions.

BURIED INDIRECT

Let me be specific. Suppose you have two products. One is active so it is well-tooled. The other is made in small quantities and is whittled out by cold-chisel methods. The first takes 30 minutes to produce. The small quantity item takes 60 minutes to make because there is little tooling. Is the extra 30 minutes productive labor? "No. It is indirect." It is tooling paid for as labor because someone decided that labor would be cheaper than tools.

Do not assume that I am quibbling over details. Think what happens when we apply overhead. In the illustration, we would apply twice as much of the tool cost per piece to the item that had little tooling. That process would undercost the product that was tooled.

Tools are overhead. So are extra work, waiting time and setups. Yet these overhead costs are buried in what some folks call direct labor. The result is that many overhead costings are in error.

But our subject is cost control. And in this, such details are significant. Overhead time costs that are buried in direct labor standards cause two defects. First, they cannot earn overhead. Therefore, product costs and overhead ratios are misleading. Secondly and of more interest, we are not made aware of these controllable waste costs. They are not brought out in the open. Consequently, they continue uncontrolled.

Of course, the work must be paid for. But allowances should be made when the extras occur. This is the only fair method and the one that calls attention to the extra costs. Take waiting time, as an example. If it is buried in work standards, it must be allowed as an average time. The man on incentive takes the bitter with the sweet. On the other hand, when no delay time is included, he calls for it as it occurs. Then everyone is made aware of lost time. Something is done to control the amount.

The same applies to extras caused by faulty materials, non-standard conditions and setups. The latter is very important in the job shops. These extras should be kept separate. And they should be on incentive. The work should be measured. It should not be covered by day-work allowances because again, this is usually classified as productive labor when actually it is mostly indirect.

All the work should be measured and on incentive. That is the only way I know to separate the productive labor from the extras and control the costs. As initially stated, the work done on incentive will have a practically constant cost per unit of standard time. Now, I can point out that this applies equally to the productive and to the indirect part of so-called direct labor. Thus, we can separate the wasted effort from the productive work.

SUPERVISION INCENTIVE

Separating and reporting time losses is only cost accounting. Saving and controlling these losses is what we are interested in. And in my opinion, the one person who can do this most effectively is the foreman. He is right there. He knows when the time is being spent. This is one good reason why he too should be on incentive.

Supervision incentive should be based on the control of time costs. Other factors are important, especially the performance of his people. Cost and performances can be tied together in a sound method of incentive for the supervisor. As he changes lost time to production, his earnings increase. As he helps to attain better performances with his people, his earnings are further increased. Both improvements add to productivity.

REDUCING FIXED

The increases in productivity gained through better performances and lower

time losses make definite reductions in fixed charges. Of course, the gains are long-term savings. More output comes from the same equipment. Perhaps, new products or greater volume can be introduced with little or no expansion.

Savings in fixed charges are considerable when you recall that over $8,000 is the average investment per employee. All gains made help to offset the vast sums we pour everyday into mechanical improvements.

RIGHT PREDICTIONS

Important as savings are, there is another element more valuable. To me, the most constructive result of wage incentive is the ability to make reliable predictions. Predicting is probably the biggest job management has. Predicting costs, deliveries, and economies is the most critical factor in control.

I know I am prejudiced but long association with job shops makes me think that nothing is quite so important as knowing how you will make out. Every job is a new venture. Under such conditions, most of the headaches are removed when you have sound standard data and successful incentives. Out of these experiences grows my belief that good incentive is the "fly wheel" that enables management predictions to come true. In addition, the measurement of true productive labor provides a sound basis for cost control.

INDIRECT RATIOS

Theoretically, all costs should be proportional to output. Actually however, such an ideal is unattainable in a going concern. The chief difficulties are found in the constant costs in overhead labor. Here is where we need more control.

Very few concerns have either incentives or controls for overhead labor. Some think they have controls in the forms of ratios of indirect to direct or percentages of sales dollars. Both are meaningless. For example, take clerical costs. Many of these are constant per sales order regardless of the amount of dollars. Engineering and selling expenses are not proportional to the dollar amount. For one thing, changes in the type of products sold will throw off sales percentages. This is true particularly with a shift in product mix that distorts the average material content in a sales dollar.

Then too, in my opinion, salesmen should sell the skill and ability of the organization. Material is just the vehicle. Also, engineers in many companies do their best work when they raise the ratio. The better the engineering, the lower the labor cost. Besides, selling and engineering expenses are often very much greater for some products than others. I know of a case where the sales expense for the same product was over ten times as large with one type of marketing as with the other. So ratios can be very misleading.

MEASURE THE WORK

Again what we need are standards and incentives. We think of salesmen as having incentives because we pay commissions. Yet, a flat three per cent of the selling price is unsound. First, consider simple arithmetic. If a salesman succeeds in getting the price reduced by five per cent, all he loses is fifteen hundredths of one per cent. But the profit has been reduced more than his commission. Secondly, the material content of one product is very much different from another. Here again, I think his job is to sell the skill and ability of his organization, not so many dollars worth of metal. More especially, I think his job is to sell the products that the company needs to balance production. Third, and this we touched on previously, selling expense differs according to marketing methods, territories, advertising and like factors. Finally, we get back to the constant cost that, in the shop, we call setup.

I have deliberately analyzed the sales operation to see if we can look at the forest instead of the trees. But the same general thinking applies to engineering, clerical and maintenance.

For cost control of these indirect labor expenses we need standards and incentives. Many concerns already have incentives on both sides of this large group of indirect people in between. They have incentives on the direct work in the shop. They have sales commissions and executives bonuses. Why neglect the bulk of the indirect people?

DIRECTED INCENTIVES

We should have incentives because most people want to get ahead. Each of us wants to be recognized as an individual. You want to be rewarded according to your own skill and application. And with incentives, you can effect controls that are almost unattainable any other way. With incentives, you can emphasize the objectives you want to attain.

To illustrate, many plants have suggestion plans to reward those who figure out better methods. Some plants pay inspectors an added premium to pick out the defectives. Some companies pay a higher bonus for selling certain products and none at all after quotas have been met.

We do the same thing in the shop. We set standards to get more production but that is not all. We want only so many pieces of a kind, however, so we issue a production order for a stated quantity. With suggestions, we tie these factors together in rewards for savings, not number of suggestions. Therefore, incentives are particularly helpful in cost control in that they can be made directional. They can be pointed toward the objectives that you want to attain. These are not necessarily lower costs on the operation involved. As examples, we mentioned that increases in engineering cost may be more than offset by cheaper processing. Some plants give the oil can to a high priced mechanic because he can prevent costly break-downs. Some plants use two mechanics instead of a mechanic and a helper because certain operations can be better balanced.

TIMESTUDY ANALYSIS

Of course to apply incentives, you should have standards. And right away you throw up your hands and say, "It can't be done." But some folks have already done it. Clerical work is on. Maintenance work is covered. Yes, even draughting has been put on incentive.

And your next question is, "How would you start?" "With a timestudy," is my invariable answer. Here's the reason. With timestudy, you can get four essentials of cost control that are not attainable by another single method. Let's break the problem down into its four essentials.

First, you can get incentives with group bonus, profit-sharing and budget plans. These plans are devised to escape timestudy. *But all four essentials are by-passed.* Besides, such plans fail to recognize and reward the individual.

The prime essential, to my way of thinking, is a detailed record of the work done. This is necessary because operations are always changing. Work standards must be kept up to date. We must know what is included in a standard before we can correctly revise it. Any other approach is what we have come to call "ratecutting."

Secondly, with a detailed analysis of what is done, you can improve methods. You can eliminate much that goes on year after year. We start operations that we forget to stop. Of course, you can make methods improvements without timestudy. Everybody does. But with the usual approach, you get no time values. Nor do you derive two other sets of facts important in cost control.

One set of facts and our next essential is the establishment of the constant part of indirect — the setup, if you please. This setup is perhaps the biggest reason why ratios are not any good for control purposes. This constant is the cause of variations in cost with volume. It is the factor that creates what we call the Break-even Point. Let me cite examples. You spend about the same time to engineer an order whether one or a dozen pieces are to be made. You pay about the same amount for typing an invoice whether it is for one or a thousand dollars. Your cost for sweeping a department is practically constant whether there are ten or twenty men working.

The fourth essential and set of facts needed is one that few consider. It is the correct analysis of indirect with respect to the several products. This analysis is vital to cost control. The product mix is always changing. In any period, the products that are relatively more expensive to engineer, to sell, to plan or to timestudy may be greater or smaller in volume with sales dollars the same or different in the opposite direction.

Thus we have four elements besides incentive to reckon with if we really want cost control. We have to know what work is to be done for the multitude of differing business conditions. Then we have to set standards that take account of these conditions. As I express it, "The standards must automatically adjust for changes in the character of the business." That is only a way of stressing the point. It does not apply to all work.

WORK BUDGETS

For instance, there are many operations that are optional. And standards for the control of such expenses must be based on decisions. Shall we wash the windows once a month or once a year? Shall we issue a route card with every order? Shall we keep a perpetual inventory? Many such questions now are answered by the statement, "We have always done it that way."

But when we think of incentives for cost control, two big questions arise. First, what is it that we want to get done? Second, how often do we want it done? As in the shop, how many pieces are on the order? The important difference here is that the quantity for indirect operations must be established internally. The customer does not do that for us as he does for the direct operations.

You may say that we accomplish the same thing with budgets. Budgets are a short cut, like group incentives and profit-sharing. They do not specify either the work to be done or the number of times. What happens with budgetary control, in many instances, is that the work is postponed or abandoned when the budget runs out.

I worked in a plant that controlled maintenance costs just that way. For each job, a work order was set up with an estimate. As work was done, the time was charged. The charge was subtracted from the remainder. When the estimated time ran out, the work stopped. The estimate could have been wrong. The work may have been done inefficiently. There were no incentives.

But the point is that ordinary budgets do not control costs, as we are discussing them. They may hold the time or dollar amounts to some predetermined standard without any assurance that the work is done. If the work can be abandoned, why not eliminate it from consideration? Why, in effect, allow spending in relation to how much we have? That is not cost control. That is not the way you set up your shop operations. You cannot stop work on a product the customer wants simply because the money runs out.

Therefore, if we want cost control of indirect labor operations, we must have standards in two parts. First, we must have measures of the work to be done. Secondly, we need standards that govern the number of times the work is to be done. If both are not specified, the options may be exercised and portions of the work will be postponed or abandoned.

PRODUCT COSTS

With such standards, the next phase of control can be set up. This requires that indirect labor expenses be arranged by types of products. This is the only way I know to gain control of costs with the ever changing volumes of multiple products. Obviously, some products cost more in overhead labor than others. It takes more engineering, more clerical, more selling or more timestudy to get out certain products. If these facts are not recorded by types of products, then we cannot know what are proper costs for a current volume of mixed products.

Such indirect labor costs should not be allocated. Spreading bulk overhead with a shovel may be all right for "absorbing overhead" but it is not the way to get costs. They should be analyzed and assigned. The same applies to those costs we called charges earlier.

What we want to know is how much it costs to turn out a product and get it into the customers' hands. Notice that I make no distinction between producing and selling overhead. It is true that they move and must be controlled by different time cycles. But we are after cost controls. That means we have to get away from the notion that selling expense is a deduction from so-called gross profit. Why is selling any less of a cost than engineering, supervision, clerical, maintenance or timestudy? It isn't. And it must be measured and controlled as a cost if we want cost control, as I interpret it.

BREAKING DOWN AVERAGES

Now all this analysis of costs by products is a tedious job. But it is worth while. It will bring out some facts never before suspected. You would anticipate that when you break down an average, you will get some astounding results. This is little different from taking apart an operation through timestudy. You find all kinds of details you did not see before.

I happen to remember an instance where such a break-down revealed the cost of engineering alone on one product to be more than the selling price.

Such things can happen when you take apart an average. Obviously, the expenses not chargeable to one product must go against the others, so long as the indirect cost continues.

These details are brought out to emphasize why you must have costs by products to get control. Without them, any expense may rise or fall and you will not be able to distinguish between poor control and change in product mix. Therefore, you need the standards of cost by product to show whether expense should rise or fall. Then the comparisons of actuals with standards can correctly show good or poor performances, and how much. Only after this stage of analysis is completed can you attain practical application of supervisory or managerial incentives for cost control.

MATERIALS

Another important item should be touched on. That is material costs. Both direct and indirect materials have to be considered. Some materials may be called either, depending upon how large the usage is.

In the main, the control of material cost rests with engineering. They specify what is to be used. I want to make that point clear. Many people are confused in this phase of control. We must understand, for example, that a shop foreman cannot control material costs. All he can work on is the prevention of scrap. Likewise, he cannot reduce the expense of drills, taps and reamers except as he can cut down on spoilage.

Again, we have a parallel with the optional route card, the perpetual inventory or the window washing. If we eliminate the 5/8" holes, then the foreman does not have to use 5/8" drills. If we eliminate one coat of paint, then management, not the foreman, will save some paint.

So I think of material control in three distinct divisions. The engineers can control the basic costs. The shop supervisors can control what we may call usage. And purchasing can control the prices paid. With this approach, we can establish material cost standards based on specifications. For indirect materials, similar specifications can be established per unit of life, as with drills and grinding wheels, or per unit of output, as with some items of packing supplies.

To set such standards, you need amounts and prices. From these, you can set up product standard costs and establish a basis for measuring engineering control of material prime cost. From the amounts, perhaps most easily, you can measure variances due to prices obtained by purchasing. And again, you have bases for applying incentives for the control of costs.

REPORTING

The real value of all of these controls depends upon promptness in reporting. Two factors are important. First, incentive payments are most effective when they quickly follow the control or lack of it. Secondly, management action must be prompt. If you know that something went wrong yesterday, only one day is lost. If you do not find it out until 45 days afterwards, the loss may be 45 times as great. What you need also then is reporting as prompt as the newspaper. Then if you take action as promptly, costs will be in control.

GETTING CONTROL

We have taken in a lot of territory. Only the high spots have been touched. But I hope that certain points have been made clear. We can have incentives that will produce desirable results. But if we want incentives for cost control, we must have standards. How else will we know whether or not the cost is controlled? Improving on past performances is not the right approach. We must know how costs should change with shifting characteristics of the business. This means an analysis of costs by products. But we need to know more. What part of the cost of any of the products is constant regardless of volume? What part varies with volume? What parts of any of these costs do we carry on from habit? What parts are optional? In other words, we have to decide what work must be done and how often. Having decided, we can set standards for measurement provided we record the work to be done in details. Such records and standards, in my opinion, should be built up from time-studies.

With proper standards and prompt reporting, we can apply sound incentives. These will provide the urge for the people in the organization to reduce and stabilize costs. This stabilizing of performances against standards is the most important result. It takes a lot of the guessing out of progressive management. It enables management to predict results. That is what cost control means to me. And incentives are the prime movers that can help most in the attainment of our objectives.

ADVANCE NOTICE

Chapter	*Date*	*Subject and Speakers*
Milwaukee	March 9	"Our challenge is Supervision", H. C. Marmaduke, Executive Department, Illinois Central Railroad.
Baltimore	March	"Quality Control, An Industrial Tool", A Round Table discussion. Chairman, J. M. McGlasson, Assistant Plant Manager, Calvert Distilling Co. Date to be announced.
Greensboro	March 27	"Appraising the Results of Motion Study", Dr. Lillian M. Gilbreth.
St. Louis	April 21	"Materials Handling", a full day conference sponsored jointly by the ASME and SAM, at Winston-Salem, N.C.
Detroit	April 17th & 18th	Methods Study and Work Measurement Clinic under the direction of Professor Ralph M. Barnes. For details write St. Louis Chapter, P. O. Box 4033, St. Louis 21, Missouri.
Detroit	April 4	"Motion Study Applied to Machine Tool Design", H. E. Blank, Managing Editor of *Modern Industry*.
Detroit	April 18	"Material Handling Planning and Analysis", W. J. Dernberger, Supervisor of Material Handling, Ford Motor Company.

SOCIETY NEWS

Speakers' table at SAM Philadelphia Regional Conference, December 2, 1949. (Left to right) A. E. Hooper, President, South Jersey Chapter; Don Ward,, President, Philadelphia Chapter; Al Mettler, General Conference Chairman; Fred W. Hornbruch, Board Chairman; W. W. Watts, Vice President R.C.A., Victor Division, Speaker; Norman Hicks, Wilmington Chapter Conference Committee; P. Kay Schwartz, Vice President, Proctor & Schwartz, Inc., Keynote Speaker

INDIANAPOLIS CHAPTER visits Ball Brothers Co., Inc. plant at Muncie, Indiana (Left to right:) Thomas Gockel, Milo Haffner, B. E. Gavin, John E. Hall, Ralph Breitwieser, Al Bernd, Les Strickler, Duane Elmore, J. Ralph Hadley, Eugene Ruark, and Richard Hall.

GREENSBORO, N. C. CHAPTER president Ray W. Grupenhof is the author of an article on Job Evaluation which was published in a recent issue of *Southern Power & Industry*. Mr. Grupenhof is Chief of Wage Practices Dept., Radio Shops, Western Electric Co., Winston-Salem, N.C.

PROVIDENCE CHAPTER'S February meeting was keynoted by Esmond B. Gardiner, Vice President, Pension Trust Department, Chase National Bank, New York City. His topic was "The Pension Plan and Human Relations".

NEW ORLEANS CHAPTER, the newest addition to S.A.M., received their charter at a special meeting on March 3rd. Dillard E. Bird, National President, presented the charter to Chapter President Robert W. Elsasser. The Organization Committee has done an outstanding job in developing a total charter membership of 66 individuals (15 under firm memberships) representing the foremost organizations in and around New Orleans.

Organization has been exceptionally rapid, starting with an organization meeting on September 30, 1949, addressed by Dillard E. Bird, the committee, headed by Robert W. Elsasser, picked up the job and is still going strong. The chapter hopes that, before the end of the year, they will have 100 members.

The following membership list is an excellent illustration of the sincere interest which top management has in the goals and principles of the Society. It is also a fine tribute to the efforts of the organizing committee.

CHARTER MEMBERS

Louis Abramson, Jr., President, Petrolane Gas Co., Inc.; *E. Lysle Aschaffenburg*, President and Managing Director, Pontchartrain Hotel.

Maurice F. Barr, Secretary, Paramount-Gulf Theatres, Inc.; *W. B. Banker; George L. Baum*, Industrial Engineer; *Richard O. Baumbach*, Guest House Management; *Lloyd B. Bearden*, President, Finest Foods, Inc.; *LeRoy J. Bordelon*, Budget Administrator, Manager, Budget & Finance Branch, District Public Works Office. 8nd.

Walter M. Carter, Sales Manager, Gaylord Container Corp.; *Winslow Chadwick*, Industrial Engineer, Continental Can Co.; *C. W. Cooper*, Partner, C. W. Cooper & Co.

Vincent B. D'Antoni, Executive Assistant to President Standard Fruit &

Executive Committee, Washington Chapter, (Left to right)

Elmer P. Wohl, Research Coordinator; Edward B. Wilber, adviser; Harvey Becknell, Adviser; Edmund J. Walsh, Treasurer; Howard K. Hyde, Nat'l Director; Edward McCrensky, Student Chapter Representative; Edna Falbo, Secretary; George D. Hansen, President; Ross Pope, Executive Officer; Mary Cushing Niles, Vice President—Program Development; Alonzo J. Covel, Emerson Trophy Officer; George Kerry Smith, Public Relations Officer; Virgil L. Couch, Vice President—Membership; Ivan Asay, Editor, Washington Newsletter. Missing from the photo are Fred M. Farwell, Vice President—Dinner Meetings; Dr. Paul Douglas, Adviser.

Steamship Co.; *George S. Dinwiddie*, Vice President, New Orleans Public Service, Inc.; *Streuby L. Drumm*, Vice President, New Orleans Public Service, Inc.

Robert W. Elsasser, Management Analyst; *Henry J. Engler, Jr.*, Asst. Professor of Management, Loyola University of the South; *Hugh McC. Evans*, President, D. H. Holmes Co., Ltd.

John W. Fanz; Darwin S. Fenner, Partner Merrill, Lynch, Pierce, Fenner & Beane; *Richard W. Freeman*, President, Louisiana Coca-Cola Bottling Co., Ltd.; *Robert W. French*, Dean and Professor of Business Administration, The Tulane University of Louisiana.

Clifton L. Ganus, Chairman of Board, Finest Foods, Inc.; *B. S. Gilmer*, Acting Louisiana Manager, Southern Bell Telephone and Telegraph Co.; *Leon Godchaux*, President, Leon Godchaux Clothing Co., Ltd.; *Leon Godchaux*, II, Asst. Research Director, Godchaux Sugars, Inc.; *Walter Godchaux, Jr.*, Asst. Vice President, Godchaux Sugars, Inc.; *Charles J. Guzzo*, Division General Manager, Gulf Refining Co.

Donald M. Halley, Professor of Economics & Finance, The Tulane University of Louisiana; *Justin J. Hanaw*, Chartered Life Underwriter; *Andres Horcasitas*, Special Assistant to the President of Tulane University.

Richard G. Jones, Vice-President and General Manager, Jackson Brewing Co.

Richard B. Kaufmann, Treasurer-Executive Sales, J. C. Morris Co., Ltd.

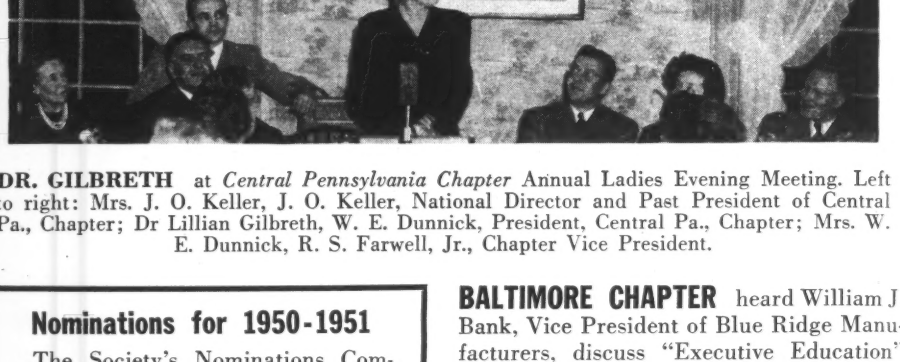
Harry B. Lackey, District Manager, Southern Bell Telephone & Telegraph Co., Inc.; *Samuel Lang*, Attorney; *Fred E. Lind*, Secretary-Treasurer, Louisiana Coca-Cola Bottling Co., Ltd.; *Charles H. Logan*, Industrial Relations.

A. C. Michaelis, Associate Professor of Management, The Tulane University of La.; *Joseph T. Miller*, Assistant Supervisor of Personnel, American Can Co.; *Alfred Jay Moran*, President, Thos. J. Moran's Sons, Inc.; *Joseph C. Morris*, Vice-President, The Tulane University of Louisiana; *Charles B. Murphy*, Certified Public Accountant.

A. B. Paterson, President, New Orleans Public Service, Inc.; *H. Wilbur Pope*, Vice-President, Hibernia National Bank in New Orleans; *Coulter B. Prescott*, Manager Retail Sales, Gulf Refining Co.

Robert S. Query, Controller, H. G. Hill Stores, Inc.

Alexander E. Ralston, Jr., Attorney; *J. Edward Rice*, Director, Naval Records Management Center, U. S. Naval Station; *Edward S. Rittler*, Certified Public Accountant, Moses, Rittler & Dienes; *James Dudd*, Operational Manager, D. H. Holmes Co., Ltd.; *J. H. Rutter*, President, J. H. Rutter Rex Mfg. Co., Inc.



DR. GILBRETH at *Central Pennsylvania Chapter* Annual Ladies Evening Meeting. Left to right: Mrs. J. O. Keller, J. O. Keller, National Director and Past President of Central Pa., Chapter; Dr Lillian Gilbreth, W. E. Dunnick, President, Central Pa., Chapter; Mrs. W. E. Dunnick, R. S. Farwell, Jr., Chapter Vice President.

Nominations for 1950-1951

The Society's Nominations Committee has proposed the following members as National Officers for 1950-1951:

President—*Dillard E. Bird*

Executive Vice President—*Leon J. Dunn*

Secretary—*Howard K. Hyde*

Treasurer—*Bruce Payne*

William H. Saunders, Jr., President, International Lubricant Corp.; *Clarence* Scheps, Controller, The Tulane University of Louisiana; *Edward A. Schlesinger, Jr.*, Executive Vice-President, Gulf Engineering Co., Inc.; *Shelley Schuster*, President, Great Southern Box Co., Inc.; *A. C. Schwarz*, Administrative Management Director, U. S. Naval Station; *William E. Shaak*, Management Engineer, William E. Shaak & Son; *Morgan L. Shaw*, Assistant Manager, Federal Reserve Bank (New Orleans Branch); *John C. Shea*, Vice-President, Whitney National Bank of New Orleans; *George H. Shields, III*, Senior Partner, George H. Shields Associates; *Robert L. Simpson*, President, C. T. Patterson Co., Inc.; *Walter D. Synder*, Manager, Pittsburgh Plate Glass Company (New Orleans); *Edgar B. Stern, Jr.*, Managing Partner, WDSU Broadcasting Services.

Paul C. Taylor, Professor of Accounting, The Tulane University of Louisiana.

R. E. Vivien, Sr., Controller, J. H. Rutter Rex Mfg. Co., Inc.

Seymour Weiss, President and Managing Director, Roosevelt Hotel; *Edmund D. Wingfield*, Vice-President, Freeport Sulphur Co.

NEW ORLEANS CHAPTER

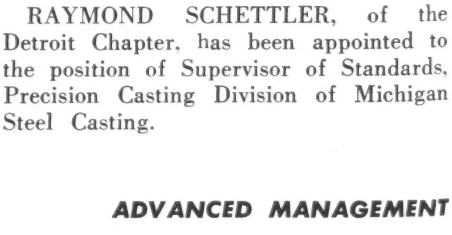
The officers of the new Chapter are:

President .....Robert W. Elsasser
Vice President .....S. L. Drumm
Secretary .....Paul Canaday Taylor
Treasurer .....Morgan L. Shaw
National Director .....
Robert Warren French

BALTIMORE CHAPTER heard William J. Bank, Vice President of Blue Ridge Manufacturers, discuss "Executive Education" at their January meeting. John Kostmayer, Industrial Relations Editor of the Research Institute of America, demonstrated how conferences can be used to get fast, intelligent action on company goals at February meeting.

WASHINGTON CHAPTER heard Congressman Robert Ramspeck, author of much civil service legislation, as their guest expert at the Management Information Roundtable designed to analyze the problem "How to Make Public Relations and Information Services Better Understood and Appreciated".

CHARLES C. JAMES, Past President of S.A.M. has been elected President of the Roberts and Mander Corp., Hatboro, Pa.



J. CHARLES MOTTASHED (right) receives Life Membership certificate from Eugene Smith. Presentation honors twenty-five years of continuous membership in SAM and its predecessor, the Taylor Society.

WILLIAM DOWLDING, Detroit Chapter Past President, has been promoted to Master Mechanic of the Long Manufacturing Division of Borg Warner Corporation.

RAYMOND SCHETTLER, of the Detroit Chapter, has been appointed to the position of Supervisor of Standards, Precision Casting Division of Michigan Steel Casting.

Labor Roundup

By Paul A. King

Assistant to Vice President for Personnel
Bigelow Sanford Carpet Company; Member of
the New York Bar

IN THIS ISSUE

WORDS CAN VEX THE WORLD—AND EMPLOYERS. The wrong interpretation of a term in a labor contract can be costly. *Union Oil* solves the problem with a special glossary . . .

JOHNSON TALKS IT OVER. Tells the employees of *Johnson and Johnson* over wire recorders what makes the company tick . . .

HOW TO READ YOUR FUTURE. It's easy for *General Mills* workers to read theirs. A remarkable booklet describes its pension plan . . .

ATOMIC VERSUS MANPOWER. This still is an age of manpower. How can you increase the performance of man? . . .

TAILOR MADE FOR MANAGEMENT. No ordinary supervisory news letter is this. *Continental Can* has made an outstanding contribution to good communication . . .

BETTER BOSSES THROUGH CORRESPONDENCE. A description of the correspondence school run by *N.Y. Central* for training supervisors . . .

OPEN SEASON ON FINANCIAL REPORTS. Also open season on confusion. How to make the language of the accountant understandable . . .

SEPARATION PAY FOR DEAD-END EMPLOYEES. If you have a union, how can you get rid of low salaried employees who have no future with the company? Here's a contract clause that may help . . .

Words Can Vex The World

Long before collective bargaining achieved its present important and often troublesome status, Edmund Burke said:

"A very great part of the mischiefs that vex this world arises from words."

Almost any arbitrator will tell you that over seventy-five per cent of the cases he hears involves the interpretation of words —and terms.

To cut down on their arbitration bills, the labor contract between *Union Oil of California* and the *Independent Union of Petroleum Workers* has a section defining terms used in the contract.

Like the idea? You can get a good start on doing the same thing by asking the *Bureau of Labor Statistics, U. S. Department of Labor*, for a copy of their just-published glossary of currently used wage terms.

Johnson Talks It Over

"Communication between top management and employees is a problem that must be solved if employer and wage earners are to live and work together in friendship, with mutual prosperity, and for the good of society."

Having stated this problem, *Robert Wood Johnson of Johnson and Johnson, New Brunswick, N. J.*, set about trying to solve it. One way selected was a series of informal talks by *Mr. Johnson*, informally delivered and recorded on tape for use on broadcasting systems in the company's plants. Some of the talks were presented during working time, especially in departments or plants where there was little noise. Other recordings were heard by general meetings of the production force, or in smaller meetings conducted by members of the line organization of the training staff.

What was told in these talks? How the various departments of the business developed and how they function; the purpose of the Board of Directors and how it operates; the growth of the various branches of *Johnson and Johnson* and the contribution of each; why everyone in the plant is a salesman; and how the line organization functions.

Would you be interested in getting some idea of how these talks sounded? Write to *Johnson and Johnson* for a copy of *"Robert Johnson Talks It Over."*

Printed versions of the recorded talks were prepared for office workers, members of management, stock holders and citizens of the community in which *Johnson and Johnson* operates its many branches.

How To Read Your Future

Big type, a few words on each page, and sprightly cartoons make *"How To Read Your Future"* an easily read booklet telling the employees of *General Mills* how the company's pension plan works.

Booklets describing pension plans are many and varied but the *General Mills* booklet deserves your special attention. For a copy, write: *Employees' Retirement System, General Mills, 400 Second Avenue South, Minneapolis 1, Minnesota.*

Atomic versus Manpower

G. Carrol Dimond, Chief, Civilian Personnel Branch of the Army wrote: "In this atomic age, it is still true that the most creative power now present in this world is manpower. We . . . must continuously discover and develop the abilities of our employees."

The first step is: Getting up performance standards. Next step: Comparing employee performance with these standards. Final step: Improving employee performance.

To give Army supervisors a thorough understanding of this 3-step procedure, *Chief Dimond* prepared a booklet called: *"Performance Ratings—A Guide For Supervisors"*. This booklet discusses performance standards, their determination, preparation and use. It talks about periodic ratings, their purpose, and the procedure for making them. The book is extremely well-written.

Another well-done job on the same subject is called: *"How To Rate"* prepared by *General Electric.*

Tailor Made For Management

Brand new and tailor-made for Continental! That's how the first issue of *Continental Can's* semi-monthly news letter for supervisors starts off.

Before this news letter, *Continental's* supervisors had been getting a similar publication put out by a leading publisher for wholesale distribution by different companies. It was a good letter but it was too general. So the company's researchers came up with a news letter designed especially for *Continental's* management.

It is called *"For Management"* and covers:

1 Company news and developments.
2 Actual experiences and methods that supervisors think are worth changing.

For Industry and Management

WAGE INCENTIVE METHODS
Charles Walter Lytle

FULLY EXPLAINS every basic plan of incentive payment. Helps you select the plan *your* business needs for stepping-up production, sustaining quality, lowering costs. Discusses job evaluation in relation to rate setting; financial incentives; union attitudes; selection of a wage plan; design of earning curves. Gives accelerating premium plans for minimum wage requirements, data on group applications, incentives for office workers, supervisors, executives. *460 pages.* **$6.00**

JOB EVALUATION METHODS
Charles Walter Lytle

USEFUL presentation of an important development in labor relations. Tells what job evaluation is and why; how to set up a plan; the way to operate it; what benefits it has for management and employees. Explains details of current methods and techniques; shows how to set up and apply measuring scales; how to analyze jobs and write specifications. Suggestions are given for adjusting a plan already in operation to conform to the best practice. *Illustrated. 329 pages.* **$6.00**

ELECTRONICS
Principles & Applications
Ralph R. Wright

JUST PUBLISHED—basic information for those who want to branch out into electronics—radio, television, other communications, industry. Offers better understanding of principles, and how they can be applied to control or facilitate industrial processes. Covers gas tubes, thermionic high-vacuum tubes, circuit analysis, amplification, modulation and detection, cathode-ray tubes, light-sensitive devices, X-ray, high frequency heating, basic control circuits. *400 pages.* **$5.50**

MAIL COUPON **Examination Offer**

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Send me the books checked. Within 5 days I will either remit price, plus delivery charges, or return the books. *(We pay delivery if check accompanies order.)*

☐ WAGE INCENTIVE METHODS, Lytle $6.00
☐ JOB EVALUATION METHODS, Lytle 6.00
☐ ELECTRONICS, Wright 5.50

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3 Union news and developments that might be of interest to management.
4 Interesting arbitration and labor board decisions.
5 Industry and production news in general.
6 Personnel and employee-relations ideas.

Many supervisory bulletins cover these items but what makes "*For Management*" outstanding is the company's insistence that the publication be written in clear common English, that it be dressed up with meaningful cartoons and that its typography be pleasing.

Better Bosses Through Correspondence

Making better bosses through correspondence is an achievement of the *New York Central Railroad.* They recently ran a 10-lesson correspondence course for its supervisors setting forth the principles of good executive technique.

Each lesson ran about 10 pages of text followed by a fast-reading summary. Enclosed was a quiz sheet to be filled out by the employee and sent to the Personnel Department for grading.

The Personnel Department graded the answers and sent the employee the next lesson.

All of the lessons fit into a binder called: "*Be A Better Boss*".

Titles of some of the lessons were: "*Understanding People*", "*Learning To Lead*", "*How To Build Employee Morale*", "*How To Handle Problems*".

Open Season On Financial Reports

This is the time of the year when financial reports are in season and the average employee who reads one is confounded and confused by the financial jargon he finds—that strange and wonderful language of accountants that baffles the lay ear.

Financial jargon is translated by pictures and words into what "us mortals" can understand in a special feature run in "*Better Living*" a *DuPont* employee publication and in "Rolling Stock", the employee magazine put out by the *American Car and Foundry Company.*

Let's look at the first page of the feature: There are three columns. The first is headed—"Term"; the second—"Fantasy"; and the third—"Fact". How is the term "Assets" defined?

In the column headed "Fantasy" there is a cartoon of a fat capitalistic gentleman with a black cigar in his mouth and his pockets bulging with stocks and bonds.

Below is this description: "Cash or securities which a financier uses to plunge in the stock market, or money which a big businessman keeps on hand to impress his office visitors."

Now what is the *factual* definition of "Assets"? Under a drawing of a typical suburban home you'll find this: "Property or resources, such as a man's car and house, or a firm's plants and materials, or a list of such property in firm's annual financial statement".

Some of the other terms defined in this fashion are: Surplus, Fiscal Year, Depreciation, Amortization.

Separation Pay For Dead-End Employees

In many companies there are dead-end jobs where earnings are small and opportunity for promotion limited. If an employee stays in such a job for any length of time, he becomes unhappy with management and management becomes unhappy with him. Where there is a union, it may be difficult to fire this employee. However, the contract between the *New York Stock Exchange* and the *Office Employees International Union* handles this situation skillfully.

The contract reads:

"In view of the character of work performed by junior floor employees, and the limited earnings appropriate to such work, and the limited opportunities for promotion open to such employees; it is agreed that no employees shall be employed as a junior floor employee for a period of more than five years. The *Exchange* agrees that any junior floor employee with more than four years employment may, if not promoted to a higher job classification, elect to leave the employ of the *Exchange;* and to accept a separation allowance based on his completed years of service with the *Exchange* as set forth above, provided, however, that if such employee fails to elect such voluntary separation allowance before the completion of his fifth year of employment with the *Exchange,* then such employee shall be separated at the completion of his fifth year of employment and shall be paid a separation allowance in accordance with the above.

NOTES ABOUT AUTHORS

PROFESSOR C. E. BULLINGER, head of the Department of Industrial Engineering at Pennsylvania State College, is the author of "*Engineering Economic Analysis*" which McGraw-Hill announces is being issued in its second edition this month. Since 1942 the first edition has been one of the most widely used college texts in the field. Professor Bullinger is Chairman of the Membership Committee of the *Central Pennsylvania Chapter.*

J. L. SCHWAB, National Director of S.A.M. and co-author of "Methods-Time Measurement" is editing a new book on materials handling which will be published by McGraw-Hill in the near future.

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To simplify reference work, articles in both publications are grouped by author, title, and subject. Those which appeared in Advanced Management are indicated by the letters A M which appear in each case immediately before the month in which the article was printed. All others are Modern Management articles.

The December, 1949, issue of Advanced Management, Volume XIV No. 4, marks the first appearance of the two magazines combined as one. The combined publication now appears monthly under the title, "Advanced Management," combined with Modern Management.

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